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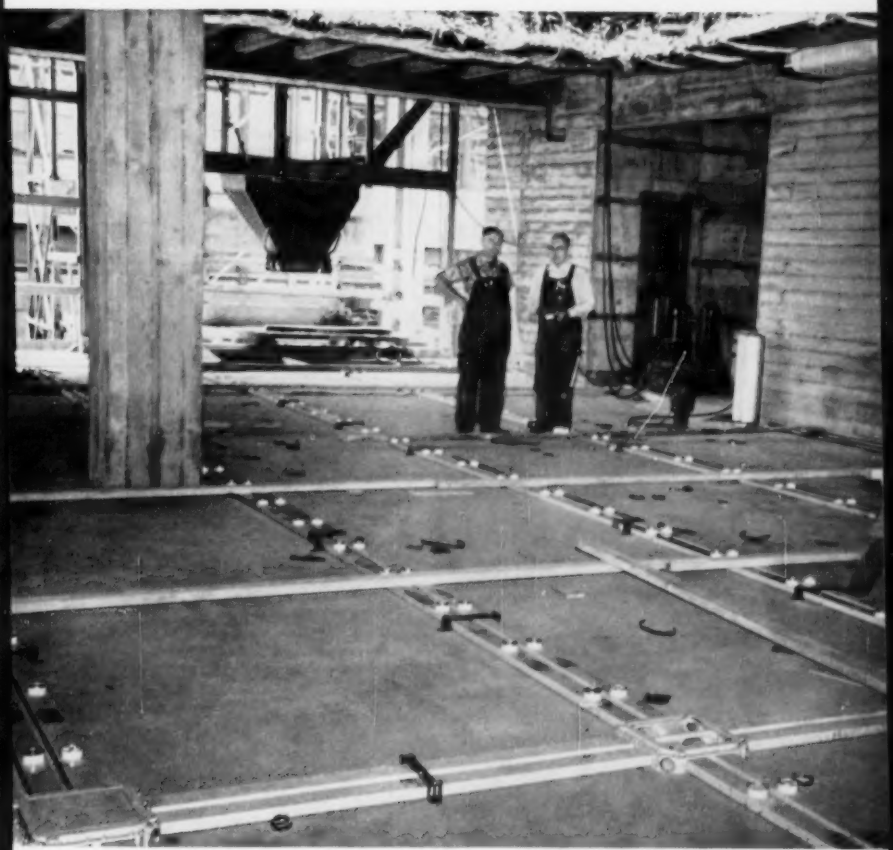
ELECTRICAL WEST

July 1957
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.



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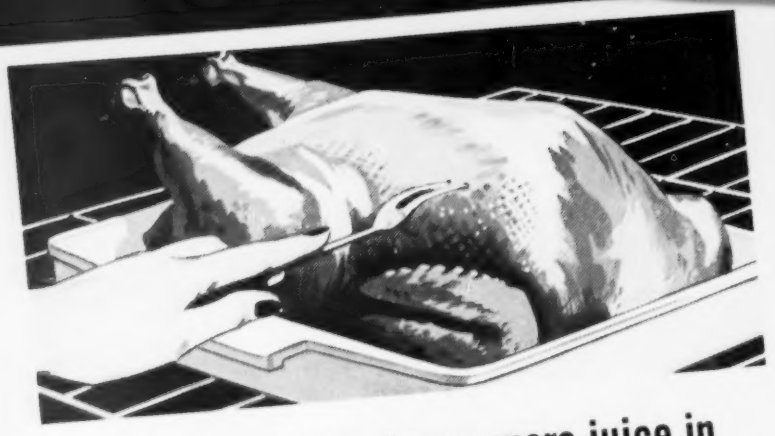
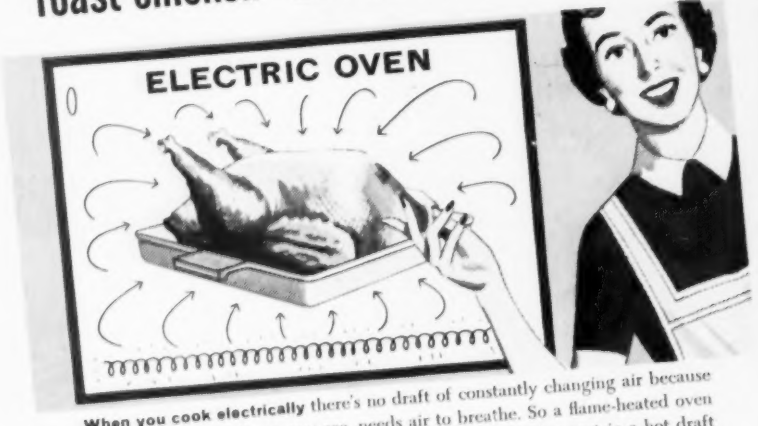
Edison
is selling the
advantages
of electric cooking—
to boost your
electric range
sales



Electric cooking keeps more juice in roast chicken—*because it's flameless!*



When you cook electrically there's no draft of constantly changing air because there's no flame. (Flame, you see, needs air to breathe. So a flame-heated oven constantly inhales dry air, exhales moist air—literally cooks meat in a hot draft that evaporates good juices.) In an electric oven there's no draft of dry air. You cook with moist heat. As a result, more juice stays in the meat... and the meat tastes better.

Electric cooking is far cooler, too. As much as 16° cooler. The reason is obvious: electric cooking puts the heat directly into the food, not into the room. Electric cooking is cleaner, too, because it's flameless. There are no by-products of combustion to dirty walls and darken your bright pans. Truly, it's the *only modern way* to cook. Why not see your appliance dealer for a demonstration of the new electric ranges?

SOUTHERN CALIFORNIA Edison COMPANY

LIVE BETTER—ELECTRICALLY!

Did you know? Flameless electric cooking costs about $1.50 a month for a family of 4

600 FIXTURES INSTALLED IN 1 DAY

...proves SMOOT-HOLMAN Luminaires go up faster...easier

In a recent West Coast installation, 30 men installed 600 Smoot-Holman Industrial Luminaires in a single day. An amazing accomplishment, possible with the **unique design features** of Smoot-Holman fixtures. Faster installation and easier maintenance saves time and money. This economy comes from quality Smoot-Holman fixtures to benefit architect, contractor and customer.

For complete information on the rugged D-284 Industrial and other Smoot-Holman fixtures, call our nearest representative. Learn how you, too, can get more for your money from Smoot-Holman.

SMOOT-HOLMAN INGLEWOOD, CALIFORNIA

We support the National Lighting Bureau

service in the west and southwest for all school, commercial and industrial lighting

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

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Next Month

Engineering will carry several of the selected association papers on a broad cross section of industry subjects. Lighting and Wiring will tell how the joint industry board of electrical contractors and the union operates in Arizona. Market Development will carry details of a utility promotion of electric heat and pictures of San Francisco's Summer market.

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L-M's Permaline conduit is light, easy to handle, easy to install. One man can easily carry two 10-foot lengths.

L-M's extra-long 10-foot lengths of Permaline conduit speed installation. Simply tapping the tapered coupling onto the tapered end of the conduit makes a strong, watertight joint—no caulking needed.

Saves Time and Labor...

Contractor Eliminates 13,750 Joints

With Long 10-foot Lengths of L-M Permaline Conduit!

Now, with L-M's exclusive 10-foot lengths of Permaline fibre conduit, you can eliminate 20% to 50% of the joints to be made on a job, and thus cut costly construction time and labor.

On one job requiring 550,000 feet of conduit, the contractor eliminated 13,750 joints by using L-M's long 10-foot lengths as compared with 8-foot lengths.

It will pay you to use L-M's time- and labor-saving 10-foot lengths of Permaline conduit for your next duct job. Only L-M Permaline is available in these 10-foot lengths.

Easy to Install

L-M lightweight Permaline fibre conduit is also easy to install. Joints are quickly made by simply tapping the tapered coupling onto the tapered end of the conduit. Joints are watertight and safe from seepage. Smooth bore reduces cable sheath abrasion. Completely engineered system for installation includes full line of bends, bell ends, couplings, and base and intermediate spacers.

L-M Permaline fibre conduit comes in 5, 8 and 10-foot lengths. Available diameters include 2, 3, 3½, 4, 4½, 5 and 6-inch sizes.

Get Complete Information

Ask the L-M Field Engineer for a copy of the 12-point plan folder which shows how easy it is to use the Permaline system; or Fibre Conduit Bulletin UG1A, which gives complete specifications. Or write Line Material Industries, Milwaukee 1, Wisconsin.

310

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

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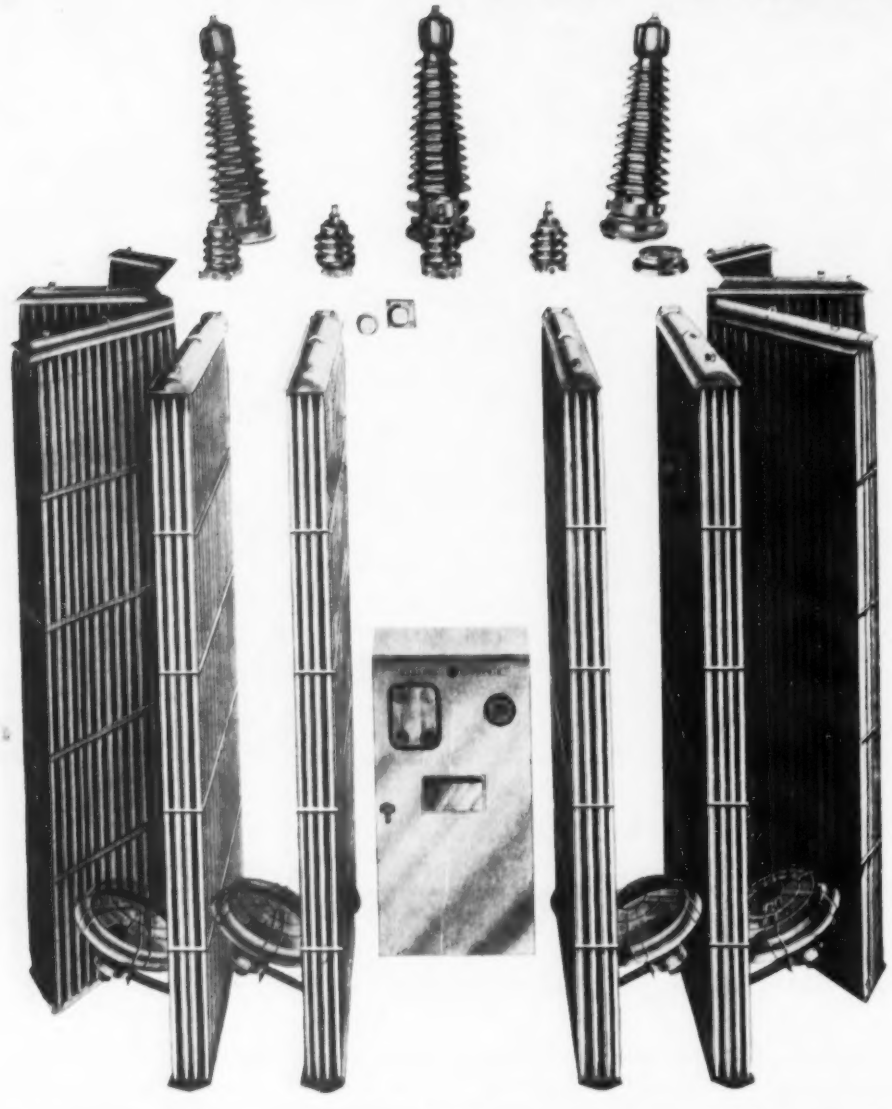
Permaline Fibre Conduit

BPI

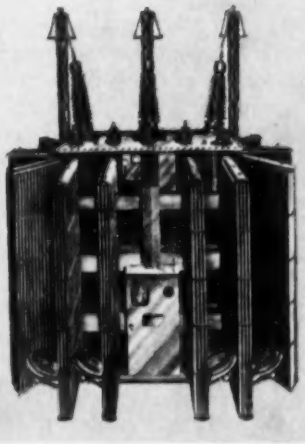
This seal is your guarantee of recognized quality in Bituminous Fibre Conduit.

NEW FROM GENERAL ELECTRIC:



TYPICAL UTILITY-PREFERRED PD FEATURES:

- **COOLING:** Location of cooling equipment for self-(OA), fan-(OA/FA and OA/FA/FA), or forced-oil-cooled (FOA) units provides easy access for handling and maintenance.
- **CONTROL CABINET FOR ACCESSORIES:** Eye-level location simplifies operation and maintenance.
- **BOLTED COVER:** Reusable Nitrile rubber gaskets help keep domed cover liquid- and gas-tight.
- **BUSHINGS:** All are ASA-standard.
- **LTC:** Proven reliable load tap changer has hinged doors and is shipped in place.
- **NO-LOAD TAP CHANGERS:** Single, floor-level operating handle is used.



PREFERRED DESIGN* POWER TRANSFORMERS

Utility-preferred features in a better transformer, shipped 6-12 weeks faster

A new line of power transformers—called Preferred Design—available from General Electric, offers unprecedented advances and advantages to the utility industry.

Designed to fulfill the vast majority of your requirements for three-phase transformers in any kva rating up to and including 50,000 kva (maximum rating), this new family of PD unite is available in OA, OA/FA, OA/FA/FA, and FOA types, and in 69-, 115-, and 138-kv classes with and without load tap changing. The line incorporates features carefully selected after extensive surveys and analyses of industry practices and preferences. Here are just a few of the tangible benefits to users of PD transformers:

BETTER TRANSFORMERS, with extraordinary flexibility in electrical characteristics, result from the application of a 705 Electronic Data Processing Machine to transformer design. This computer performs design operations up to 3800 times faster than hand methods, makes more precise and comprehensive calculations, and helps provide the optimum design for each application.

APPROVED CONSTRUCTION DRAWINGS will be sent *with the proposition* on all Preferred Design transformers. This speeds utility substation design and construction, helps you cut costs by eliminating delays.

SHIPMENT 6 TO 12 WEEKS SOONER is standard practice with PD transformers, because the speed of the 705 eliminates weeks of laborious engineering calculations.

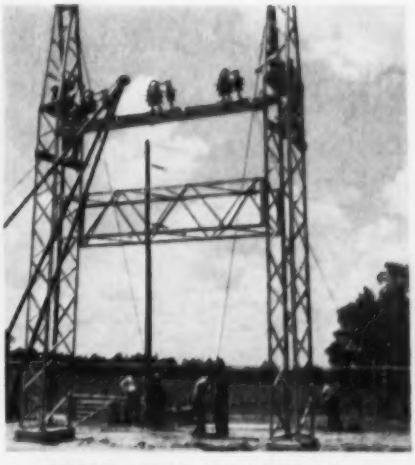
COMPLETE INFORMATION can be obtained by contacting your G-E Sales Engineer or by writing to Section 426-1, General Electric Company, Schenectady, N. Y.

*Preferred Design (PD) power transformers contain features which, based on surveys of electric utilities, have an average acceptance of 86%.

Progress Is Our Most Important Product

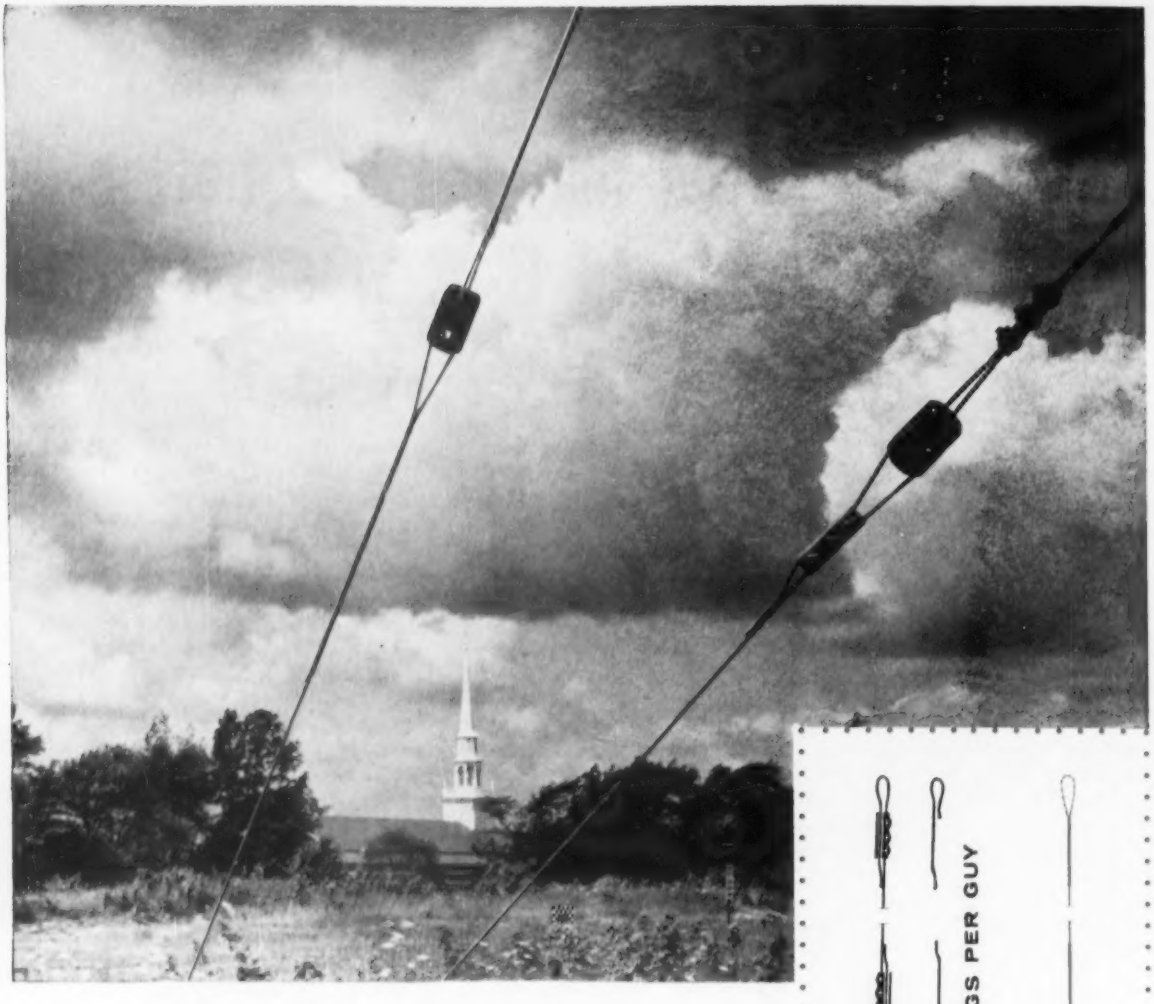
GENERAL ELECTRIC

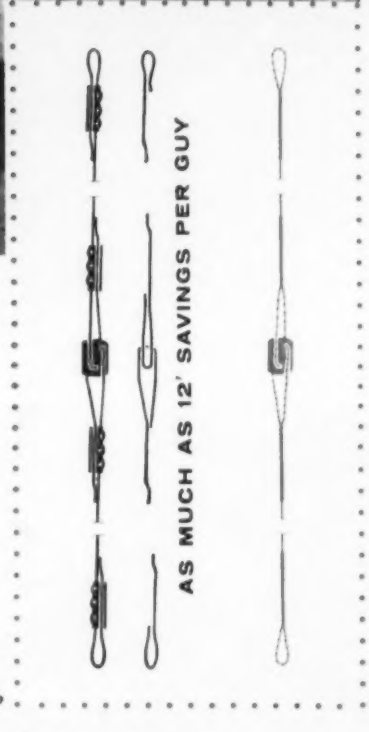
BETTER TRANSFORMERS result from optimizing of designs by new IBM-705 computer.



CONSTRUCTION DRAWINGS submitted with propositions will speed your construction, help cut your costs.

6 TO 12 WEEKS FASTER SHIPMENT is standard on all Preferred Design power transformers.





Up to 30% savings in strand... with PLP Guy-Grip Dead-Ends

You will find real guying economy with PLP Guy-Grip dead-ends. Because they eliminate strand looping, you can use *shorter, straight* lengths of guy strand. This means as much as 12 feet savings in strand per guy. What's more, the finished installation is neat, streamlined, efficient.

PX-80

Made in accordance with or for use under U. S. Patent No. 2,761,273; other patents issued and pending.

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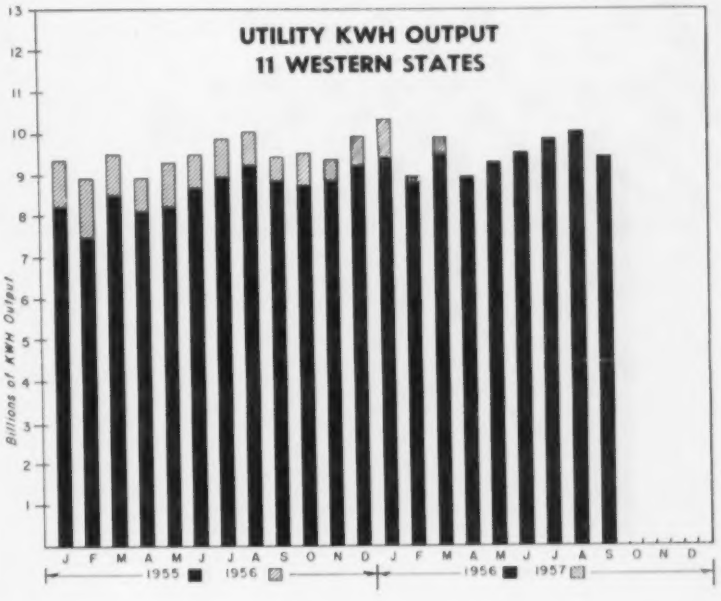
----How're We Doing?



Output Comparisons

Year-to-year Kwh Output Changes in Western Regions and U. S.
Per Cent Changes Over Same Week One Year Ago

Week Ending	Rocky Mountain	Pacific Southwest	Pacific Northwest	U. S. Total
May 11	+ 3.1	+ 5.2	+12.4	+ 4.4
May 18	+ 2.6	+ 6.7	+ 9.4	+ 5.9
May 25	− 0.4	+10.6	+ 2.9	+ 5.9
June 1	− 0.6	+ 5.7	+ 6.1	+ 3.4

Ups and Downs

Housing starts look like they are climbing back up toward the million a year rate. Appliance sales, however, are still sluggish overall. Air conditioners, particularly in the northern belt of the country, have been held back by cool weather. Public building, particularly in the educational field, is booming and capital expenditure by industry is continuing at an open-throttle rate. This all adds up to record high employment and high consumer incomes—an excellent climate for some tempting Live Better . . . *Electrically* promotions. Prices on many items were marked up in June—mostly attributed to wage increases. This confirms what an administration spokesman termed "disturbing indication of renewed inflation"—and a strong support for a continued tight-money policy.

Reserves

EEI's recent semiannual power survey release projects reserve capacity for four years ahead. In the Northwest, margins will improve from 4.6% in 1957 to 12.8% by 1960. In the Pacific Southwest, output capability will be ahead of estimated peak load by 24.1% in 1960—up from its present 15.5%. Another finding: the Pacific Southwest region as a whole will pass from a winter peak area to a summer system peak this year—with the latter becoming more predominant as the years pass along.

news roundup

INFLATION NOTE—Figures from no less an authority than the U.S. Department of Labor show that wages have far out-distanced productivity in the U.S.

Specifically, in 10 years payments to labor rose 61% while productivity came up only 26%, thus increasing the real labor costs for each unit of output by approximately 28%. During this same period corporate profits after taxes actually declined almost half a billion dollars.

Another reliable source stated that the average hourly earnings in manufacturing increased 10% from mid-1955 to the end of 1956 but that the output per man-hour rose only 2% per year for the economy as a whole. Wages, plus fringe benefits, have exceeded 5% per year in key industries since 1954. It's the age-old formula; more dollars plus less products equal higher prices and inflation.

—EW—

Utah Power & Light President Edward M. Naughton is the new chairman of the Public Information Program steering committee.

—EW—

BREAK - THROUGH – America's first supercritical power unit is on the line at the American Gas & Electric Co.'s Philo steam plant. The unit which now operates at 4,100 psi, 1,025 F at present is expected to chalk up a heat rate of less than 8,600 Btus per kwh when its steam conditions are ultimately boosted to 4,500 psi, 1,150 F with double reheat for a 120-mw net output.

Philip Sporn, president of AG&E Service Corp., envisages continued improvements in the new technology which will lower heat rates to 7,500 Btus per kwh by 1975. Such performance can't help but extend the time when atomic fuels will be competitive with conventional thermal stations.

Of more than passing interest is the fact that the new supercritical unit was installed in the same space as a 40-mw unit which was retired after 30 years of service; that it produces a kwh for 0.65 lb of coal compared to 10 lb per kwh on the first power station.

—EW—

In 1940 the West consumed a little more than 2,000,000 tons of finished steel products per year. Today Western industry requires 6,500,000 tons and Edgar Kaiser, vice-president of Kaiser Steel Corp., predicted that the demand would be 10,000,000 tons per year by 1965.

—EW—

PUMP STORAGE—Canadian Westinghouse engineers have reported on a prototype apparatus that will operate as a pump or turbine and motor or generator.

The device when completed will be installed at Sir Adam Beck generating station at Niagara Falls. For nearly eight hours a day it will operate as a holder and pump, filling the forebay, and for the remainder of the period as a generator.

The combination will require approximately 50,000 hp when operating as a pump and will generate approximately 45,000 hp as a generator.

INFLATION SIDELIGHT – The Thompson Products Co. Inc. of Cleveland comes up with a fascinating story about a million-dollar lathe. It's the lathe that cost $12,000 in 1942 but took more than a million dollars to replace. It sounds fantastic but here's the way to figure it out.

The cost of $12,000 could be depreciated over a 14-year period. At the end of 14 years the company had set aside $12,000 plus an additional $1,000 which was the resale value of the old unit. But when they went to buy the replacement unit, they found the price had jumped to $67,000 so that an additional $54,000 had to come out of company profits to keep production going.

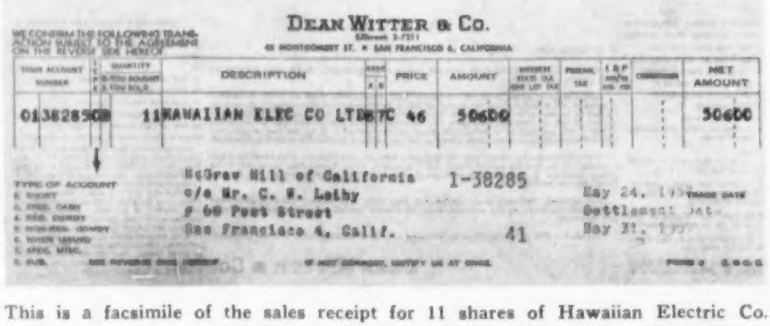
In order to clear $54,000 the company had to make a profit of $112,000 before taxes. That much profit represents the sale of more than $1,250,000 worth of its products.

—EW—

SMILES—These columns have carried items from *Arizona Progress* before, and while they are consistently amusing, Herbert Leggett, the editor, has set a new high standard in the May issue.

Cautioning the reader to take a firm grip on his chair or bar stool, Leggett proceeds to report that traffic safety experts are saying people who have not had a serious accident

Stock Purchased for Electrical West Contest



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San Francisco 4, Calif.

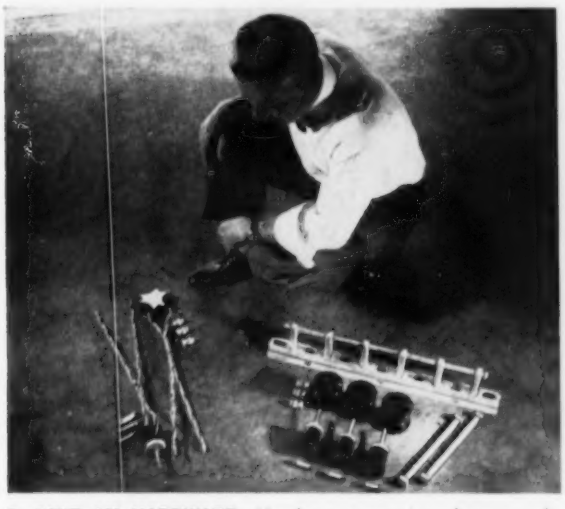
1-38285

41

May 24, 19
Settlement
May 31, 19

This is a facsimile of the sales receipt for 11 shares of Hawaiian Electric Co. stock that is now earning interest for the winner of the Kilowatt-Hour Rodeo

1. MID-SPAN TAPS help bring down the over-all cost of distribution with Rome's Triplex SD and secondary cable. You can tap between poles from either side, using conventional hardware plus a spreader block. Simple; fast; saves service wire. You save on pole cost, too—*as much as one-third*. With Rome's Triplex secondary you can span 300 feet from pole to pole. Use fewer poles; save time setting them; eliminate crossarms.



2. SAVE ON HARDWARE. Here's a comparison between the hardware needed to install one open-wire service drop (right)—using one pole—and Rome's aluminum Triplex equivalent (left) using a mid-span tap.

3. CUT MAN-HOURS on installation jobs. Triplex goes up much faster than open-wire service, because it requires less handling, less time installing hardware. It's easier to handle, too—aluminum cable assembly weighs less than conventional copper service wires.

If you take advantage of these important savings . . .

"Expensive" Triplex cables can cost less

Triplex sometimes *does* cost more than its open-wire equivalent.

But its on-line cost can be lower—*if you take advantage of the installation economies* that Triplex alone makes possible.

Fewer poles . . . less hardware . . . faster installation—these are the savings you make with Triplex. They can more than offset any extra cable cost.

In addition, there are many locations where you can improve service and reduce maintenance with Rome's aluminum Triplex. Wooded areas, for example—where Triplex *stays up* despite falling tree branches that might knock out open-wire secondaries. Residential streets, too—where good public relations indicates need for a neat, uncluttered installation.

Fits your modernization pattern

Introduced 10 years ago, Rome's Triplex SD Cable won almost immediate acceptance. As a next step in modernization, many utilities are now using lightweight aluminum Triplex for overhead secondaries as well. If you haven't yet adopted this practice, we invite you to look into the operating advantages—as well as the economies—that this Rome "package" concept offers you.

Specify Rome's aluminum Triplex for your next job. For more information, contact your nearest Rome Cable representative—or write to Department 368 and ask for descriptive Bulletin RCP-361. Rome Cable Corporation, Rome, New York.

ROME CABLE

CORPORATION

*Versatility

*Is the middle name of the Neale Model "K" pull type spinner . . .

- Spins new and existing cable
- Has instant adjustment from minimum to maximum cable sizes
- Spins one or two spirals
- Lashes one, two or three cables at one time
- Uses all sizes and types spinning wire
- Weighs only 36 pounds

THE MODEL "K" IS TRULY A VERSATILE CABLE SPINNING MACHINE

PLEASE WRITE FOR LITERATURE

CABLE SPINNING EQUIPMENT CO.

3100 TOPEKA AVE.
TOPEKA KANSAS
Phone 2-7234

shouldn't be allowed to drive at all. He then quotes a psychiatrist who said: "a well-adjusted person is a sick person." He is suffering from "conventionalitis" and presumably needs the attention of a psychiatrist. Such a person "is slave to the ideas of others—and actually has a trembling mass of jelly for his innards."

Comments Leggett: "Thus civilization has apparently advanced to a point where it is abnormal to be normal."

—EW—

Well, it happened. Rep. Earl Chudoff, chairman of a House public works subcommittee, after sniping at private utility company practices for about two years, finally succeeded in getting an FPC ruling that two groups of utilities improperly charged off as operating expenses the cost of booklets concerning public vs private power. The two booklets are "Turn On the Light" and "The Federal Power Program, Its Background, Growth and Consequences." The first impulse on receiving this information is to take a quick review of our Bill of Rights. The second impulse is to rub Rep. Chudoff's nose in it.

—EW—

TRIBUTE — A group of Dillon businessmen recently gave an encouraging tribute to Montana Power Co.

Jointly buying a full page advertisement in the *Dillon Examiner*, the business and industrial leaders stated: "We owe much to those who bring the boon of electric power to our homes and places of employment. That is why, today, we are dedicating this space to the electric power companies whose network of lines enables us all to Live Better . . . *Electrically.*"

—EW—

TESTING — Two General Electric Co. engineers have presented a paper which concludes that d-c testing of a-c insulation has no clear and scientific validity.

"At present," they state, "direct voltage testing of alternating voltage equipment is being persistently and increasingly used and much money is spent not only on these tests but also on account of rewinding decisions based on such tests; although, in the authors' opinion no clear and scientific demonstration of their validity is available."

(Anybody for a rebuttal?)

ATOM PROGRAM—A report prepared by three eminent European nuclear experts, aimed at integrating the nuclear power program of France, Germany, Italy and the three Benelux countries, recommends a goal of 15,000,000 kw of nuclear power capacity for that area over the next 10 years.

The long-term nuclear program would permit massive savings in foreign exchange for European countries whose fossil fuel reserves are dwindling rapidly. For example, the estimated nuclear fuel bill for 15,000,000 kw of capacity would be about $200,000,000 a year compared with $800,000,000 which would have to be expended for conventional fuels for the same amount of capacity. Nobody has indicated how such a program would be financed. European utilities are already overstrained by the investment requirements of a rapidly rising power demand. Furthermore, the program would be heavily dependent on U.S., Great Britain and Canada for equipment, fuel and technology.

The World Bank, licensing agreements that would reduce import costs, grants of fuel and other means have been suggested as a probable way to get the program going. Not to be underestimated is the possibility that the program could provide a vast testing ground for nuclear power development that might speed the day when fission becomes competitive with fossil.

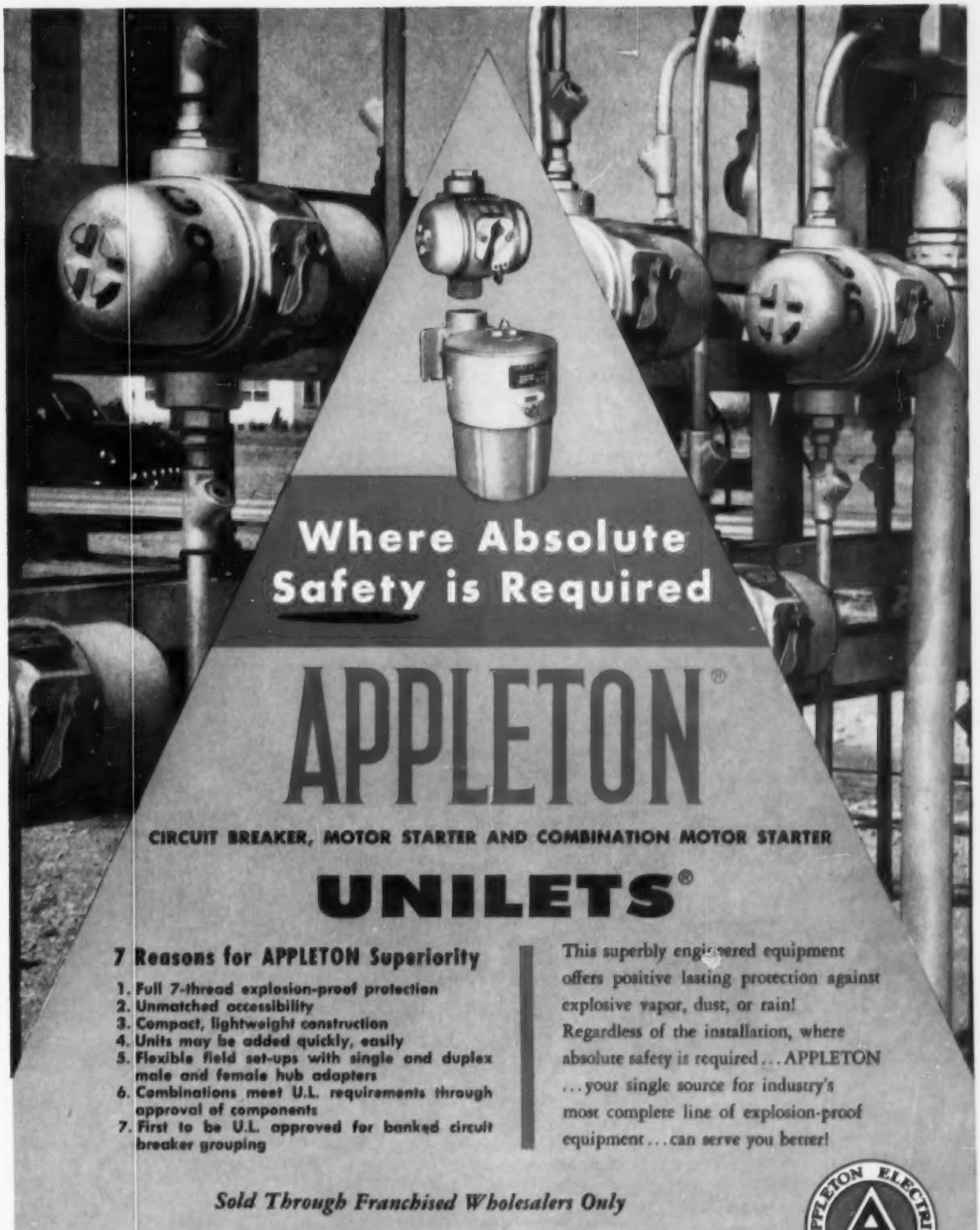
—EW—

This year marks the 100th anniversary of Mathias Klein & Sons, maker of some of the tools and safety equipment on your service trucks and in your tool pouches. Mathias Klein, founder of the firm, came to this country from Germany and had his own blacksmith shop. The shop was an off-hours hangout for telegraph linemen, which in turn led to Klein's interest in their tools and equipment. The company today is controlled by the grandson of the founder, Mathias A. Klein, and his two sons, M. A. Klein Jr. and Richard T. Klein.

—EW—

PROTEST — Leadership in the Izaak Walton League apparently is a poor qualification for membership on Oregon's Water Resources Board.

When a Portland attorney, Rollin E. Bowles, was appointed to the board by Gov. Robert D. Holmes.



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opponents of the idea said Bowles, who is also a past president of the Izaak Walton League, would be prejudiced against other water users.

They made it stick. With a two-thirds senate vote required for confirmation, the vote split 15 to 15. Legislative old-timers can't remember another instance when the senate has failed to confirm an appointment by the governor.

—EW—

When George G. Main, treasurer of Westinghouse, appeared before the Security Analysts of San Francisco recently, he started off with:

"It is a real pleasure for me to be here with you today. This is a statement which—I hasten to point out—no Westinghouse man could have truthfully made one short year ago. (Remember the long strike?)

—EW—

NEW TOOL—Microwave radio is being adapted for use by civil engineers in distance measurement.

Operating in a manner similar to radar, the system has been used in South Africa with accuracies over distances of between 500 ft and 30 miles, far exceeding first-class work with a chain and transit. Better still, it operates under any type of weather condition and is light enough (under 50 lb for the complete set) to be readily portable in the field.

—EW—

Fuel elements composed of natural uranium are being offered by Great Britain at a world market price of $49,000 *per ton. Salvage value (or buy-back price) is estimated to be about* $14,000 *a ton. At these figures the little home atomic plant seems a long, long way in the future.*

—EW—

SHAVE BETTER . . . ELECTRICALLY—At San Francisco's Mark Hopkins, where nothing is too much trouble (for the proper tip), an accommodating water main pointed a moral at last month's PCEA general meeting.

The water main broke on the second day, making it awfully easy to tell the electric shavers from the blade shavers. One PG and E operating man quipped: "Wouldn't the fur have been flying if a fluke caused the power to go off?"

MIDYEAR READING—More and more economists are jumping on the band wagon that touts 1957 as a good business year. Mixed, but compensating, trends in the first half have enabled the economy to turn in a very satisfactory performance.

Disappointing trends in auto sales and housing starts were offset by other factors. The automotive industry, however, is going to have a very respectable sales year even if it does not come up to early anticipation. The slump in housing starts appears to have touched bottom at around an annual rate of 850,000 units. In southern California for example, tract housing negotiations have turned upward.

Consumer income is rising steadily and there has been a general tendency to reduce installment debt. This adds up to a possible better performance by customers during the last half of the year and into the early months of 1958. The fact that customers now are exercising some restraint in spending and are adding to their savings at a rate close to 7% of their income adds to this possibility.

Business as a whole has exercised considerable restraint in building up inventories so that the possibility of a major setback because of heavy industrial stockpiling has just about vanished.

—EW—

Plymouth Rubber Co.'s plastic electrical tape does not infringe the patent of Minnesota Mining & Mfg. Co., according to a ruling by the United States Court of Appeals for the Fourth Circuit. The patent suit brought by Minnesota Mining set off litigation that lasted about two years.

—EW—

INDIAN WAR—The White Mountain Apache Tribal Council has won a skirmish with the Salt River Valley Water Users Assn. Legal warfare yet to come will determine whether the council has won the entire battle.

Salt River members claim jurisdiction of water in Trout Creek in the Smith Park area. The tribal council wanted to dam the creek to form a 250-acre lake for a commercial resort area. In earlier litigation the irrigation organization obtained an injunction which was to stop the resort project.

Resourceful Apaches answered this legal ruling by closing the area

HOW BELL SYSTEM COMMUNICATIONS SERVE THE POWER INDUSTRY

Harry Otten, system operation manager, and the New York areas served by Con Edison

"We've grown up with private line communications"

— an interview with Harry Otten, Con Edison system operation manager

When did Consolidated Edison first start using private line communications?

Back in 1927. It was our first automatic alarm system on certain of our lines. The board is in our operations center, and certain parts are as useful now as they were 30 years ago.

And, of course, your needs have increased since then

Tremendously! We now generate 3,400,000 Kw to serve 8½ million people in the five-county metropolitan area. Naturally, we've had to add to the communications to let us keep pace.

What do these communications include?

Principally, direct telephone communications between our dispatching centers and generating plants, substations and service headquarters throughout the 600-square-mile area that we serve. In addition, Bell System circuits perform continuously many vital functions, such as automatic control and protection, telemetering of load measurements at remote locations, supervisory control of normally unattended substations, etc.

What's the main advantage of these facilities?

First of all, we couldn't operate without them. We think of private line channels as a production tool. Thus, we obtain the advantages of ready availability of new circuits when and where we need them and the backing of an organization trained to design, construct and maintain communication facilities.

. . .

Private line communications can fit into your operation as profitably. Just call your Bell Telephone Company business office. A representative will be glad to make a study of your requirements.

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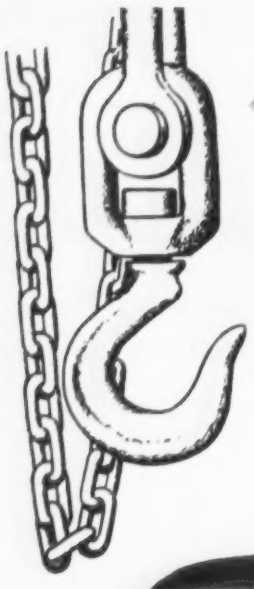

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to visitors, obtained heavy machinery and proceeded to build the dam anyway, with tribal labor.

—EW—

ROUND TABLE—The 10th annual Round Table Conference of the Edison Electric Institute industrial relations committee is going to feature J. W. McAfee, president of Union Electric Co., W. O. Turner, president and general manager of Louisiana Power & Light Co., and Edwin Vennard, EEI managing director.

Theme of the conference this year is "Enlarging Employee Effectiveness," and the three men mentioned above will contribute talks on creative communications, effective supervision and increasing industry effectiveness.

It is time now to make plans for the conference. It will be held Sept. 23-25 at the Drake Hotel in Chicago. For reservations write E. S. Evans, secretary, Industrial Relations Committee, EEI, 420 Lexington Ave., New York 17, N.Y.

—EW—

The Edison Electric Institute at its annual meeting in Chicago re-elected Donald S. Kennedy as president and J. Wesley McAfee as vice-president. Kennedy is president of Oklahoma Gas & Electric Co. and McAfee is president of Union Electric Co. of St. Louis.

—EW—

At a recent AIEE meeting, G-E's Fred Lincks stated: "However, the longer higher voltage lines, longer cables and larger capacitor banks are imposing operating duties in service which are approaching and, at higher voltages even exceeding, the discharge capacities of the sturdiest of the modern arresters." For more details on the problem see EWEST, *May 1957, p 94.*

—EW—

CODE OF ETHICS—American Society for Engineering Education has prepared a "Code of Ethics" for college recruiting. Among the taboos: (1) elaborate entertaining and overselling; (2) special payments, gifts, bonuses or inducements; (3) rewards for third parties who may prevail upon students to accept jobs.

Things will change now — sure they will.

This Amazing New Limit Switch Operates Without Physical Contact!

Transducer (sensing head) is actuated by presence of magnetic materials over a wide range of sizes, shapes, weights, roughness, speeds

No moving parts. No metal-to-metal contact required for operation

Sensitivity up to 1 inch

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Small size (1⅞" x 6") Fits into tight spots

Non-magnetic material between the part and transducer does not affect operation

• Here's an entirely new concept in industrial limit switches! We've named it the **PROXIMITY LIMIT SWITCH** because it is actuated by the nearness of ferrous parts or materials. Since its operation requires no physical contact, it has unlimited applications in places where the use of conventional limit switches is either impractical or impossible! Its range of application is broadened, too, because the transducer (sensing head) is not affected by vibration or by the presence of non-magnetic material.

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SQUARE D COMPANY

regional roundup

Northern California

HAZARDS of early retirement are pointed up by the recent painful experience of Al Rockwell, who left Appleton last year. He ruefully questions the wisdom of retiring while you are still active enough to climb a pumphouse roof.

It happened this way. Al climbed to the roof to give it a coat of paint. With the first pass with the sprayer, Al found himself out of balance and on the way to terra firma. To illustrate how firma the terra was, he split the tibia (that's a bone in the knee) to the extent that three long screws had to be placed in it for the repair job.

The operation left a scar about 9 in. long on the retired, suntanned leg, and left Al making his way around with the aid of a two-dollar cane. Here's hoping for an early recovery.

► Grover Anderson of Harvey-Hubbell Inc. reports that Tex Bensen has joined the firm. Tex will headquarter in Sacramento and handle sales in Sacramento and the San Joaquin Valley.

► More refreshing on new products and other developments took Crouse-Hinds San Francisco staffers to the main plant at Syracuse, N.Y. Towner Buckley and Bill Major made the trip first, and Bob Browning participated in a second session after the first contingent returned.

► John Ormond says there are still some folks who do not know he has moved to 600 16th St. (Pacific Bldg.) in Oakland. Make a note.

► Until Claude Erlewitz transferred to San Francisco to be manager of Graybar's new business development, we didn't know his middle name is Mark. Other information is that he has been with the company 10 years, left a job as salesman in the Stockton area to come here, and that his new job gives responsibility throughout Graybar's San Francisco area.

► Congratulations to Marc Mathers, who was recently made manager of engineering for Pacific Switchgear Division of Federal Pacific Electric Co. He has complete responsibility for all of Pacific Switchgear's product development and design engineering.

► Speaking of congratulations, when a friend congratulated Ike Borda on his promotion to vice-president and general sales manager of Okonite, Ike promptly replied, "Thank you very, very much. I'll accept your condolences, too, for having to leave California."

► Robert S. Wilson has opened an office in Richmond as engineering consultant on industrial and commercial power, lighting control, communications, estimates, specifications, surveys and reports. Address of the new institution is 737 34th St., Richmond 9, Calif.; telephone number is BEacon 4-4123.

► Harold Zamzow has just completed a busy period as student and then teacher. He traveled to Zanesville, Ohio, and Olean, N.Y., to attend refresher courses on new products and applications of them. Upon his return, he visited all of Line Material's Pacific district sales engineers and passed the information along to them.

► When Charles Nourse found that he would have to move his manufacturers' agency a while back, he suffered through the usual hunting period and found a spot at 2216 Fifth St., Berkeley. His new neighbors turned out to be Fletcher Sales Co., representative for Insul-8, Walter Weyman Co., and Heinz Machinery Co., all of whom had been his neighbors in the building he vacated. Nourse reports that he still has the same lines—just a new address.

WINNER of a recent sales contest sponsored by Electromode and Incandescent Supply Co. in San Francisco was Ray Schwerdt, Incandescent's Redding salesman. Ray and Mrs. Schwerdt are saying "good-bye" to John Helms, general sales manager of Incandescent here, and Mel Stensen, manufacturer's representative for Electromode. Schwerdt won an all-expense trip to Acapulco for himself and wife. At press time, John Helms called to say he had another picture of Ray and a great big fish, but as such things go, there was no time or space to publish proof

Pacific Northwest

"THIS is no bird brain," said George F. MacKenzie, vice-president and treasurer of Pacific Power & Light Co., as he maneuvered a fair-sized chunk of Frisbee's monster through specially built doors in the side of the Public Service building.

It was a brain all right, but it weighed 2,800 lbs, cost $300,000, and it belonged to the electronic data computer known to the trade as a Datatron. Though the "Thing" bears little resemblance to Al Capp's "Lizzard of Ooze," folks around the company call it "Frisbee's Monster," because Don C. Frisbee, assistant treasurer, has been delegated to tame it and put it to use. It will go into service first on the company's 300,000 service bills; later on

other accounting work and complex engineering problems.

► Another electronic brain has just gone into action in Portland, this one belonging to Portland General Electric's "Dutch Uncle" elevator, called so because he takes care of you and talks to you like the proverbial Dutch uncle. He says, "Press your floor button, please," "If the emergency has passed, pull the button out," and other genteel admonishments, all of course in their proper place and time. It is the Westinghouse selectomatic, automatic, phantom-voiced elevator, the second such installation in the country, the first being in Texas. Its automatic traffic pattern control is sensitive to time, weight of its load and to the buttons pressed by the passengers.

► In his quest for fresh water under the sand dunes of Coos Bay, Paul McKee, president of Pacific Power & Light, has sought the one person in the world most likely to point the way to economic extraction. That person is Cornelis Biemond, director of the Amsterdam, Holland, waterworks, where a combination of deep-well pumping and a system of canals supplies water for domestic and industrial use for a city of 900,000 people.

► The Luxtrol miniature "Mansion on Wheels" came to the Portland area in June and will go to nine cities in the territory of PGE under that company's sponsorship. It is a promotion of Superior Electric Co. The mansion has six rooms of three-fourth size, which, through the use of mirrors, appear full size. Thirty applications of controlled lighting, delivering as many different decorative effects, are demonstrated in the exhibit.

► "Good-bye Kearns Building, hello new home," will be the watchword in Utah Power & Light Co., Salt Lake, in January 1959. A new general office building to be built adjacent to the company's operations center building on West North Temple Street was recently authorized by the board of directors, according to announcement of E. M. Naughton, president. The new building will take all the offices of the company that still remain in the Kearns Building in downtown Salt Lake which has been headquarters for many years.

► National recognition has again come to Washington Water Power Co., this time in the form of first award of the U. S. Chamber of Commerce for company and employee efforts to promote "economic understanding" among customers and the public. The company's program of employee information and public contact was a major factor in the victory. Willis Clark, publicity supervisor, prepared the exhibits for the judges. Kinsey Robinson, president, accepted the trophy on behalf of all the employees at the chamber meeting in Washington, D. C.

VISITING FIREMAN Bill Cyr dropped in on Berkeley Snow on a recent trip to Arch Cape, Ore., and this is the picture of contentment that he found. Berk retired as executive manager of the Northwest Electric Light & Power Assn., but when the fire alarm sounded he was quick to jump into the harness and become your regional editor for the Pacific Northwest column

► *Some Quickies about People and Events*—NELPA, Al Krieg, executive manager, is looking forward to its 50th annual meeting (49th anniversary) Sept. 5-6, 1957, at Glacier National Park.

W. L. Trudgian, Westinghouse Electric Corp., Seattle, has been transferred to San Francisco.

Thomas Holland is the new district manager for Sylvania in Seattle, succeeding Roger L. Delander, who has been transferred to California.

V. L. Hobson has been transferred from G-E Supply Co., Seattle to San Mateo, Calif.

Federal Pacific Electric Co., Portland, has moved from the American Bank Building to larger quarters at 535 S. W. Clay St.

Albert M. Gruber, for many years WWP's division manager at Lewiston, Idaho, comes into the Spokane office in a new position, technical research analyst.

Intermountain

THE NEVER-ENDING boom in the Intermountain region is getting a couple of healthy boosts this summer from General Electric.

Construction is under way at Denver on a new office and warehouse building for the G-E Supply Co. The one-story structure with 73,000 sq ft of floor space will house office and storage facilities for the supplies and housewares division of G-E Supply and for the Hotpoint Appliance Sales Co. Bill Duncan, district manager for G-E Supply, hopes to move his outfit into the new facilities by Christmas. Warehouses at three separate locations in Denver will be consolidated at the new layout at Fifth and Quivas Streets. The exterior is finished in red brick. There is a railroad spur to the warehouse.

G-E also announced that effective Nov. 1 the supply company branch at Denver will become distributor for G-E's Appliance and Television Receiver Division. The B. K. Sweeney Co. has been G-E's major appliance distributor in Denver since 1927—the year the first G-E electric refrigerator was built.

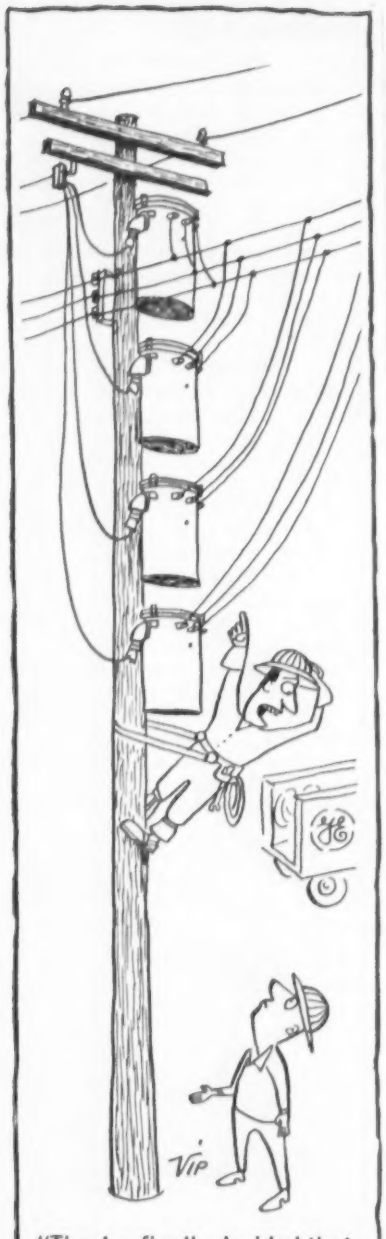
Company officials said the organization of the new appliance distributing branch has not been completed but will be announced by late summer. As a result of G-E's move, Electric Supply Co. of Albuquerque will also lose its G-E distributorship.

► Glenn B. Gaer, president of the Rocky Mountain Electrical Manufacturers' Representative Club, has picked the committee to work out details for the electrical show in Denver next spring. Jim Wall of the W. E. Young Electric Co. was chosen chairman. Working with him are L. S. Reed and Clyde Elliott, who operate firms under their own names, and George Kaub of Hubert Kaub & Co.

Gaer said the two-day show, dates of which aren't fixed, will be directed toward architects, engineers, electrical contractors and industrial firms. Gaer reports the 44 members of the club have all pledged their support to the event.

► W. E. Lund, who has been with Westinghouse in Chicago the past two years, has joined Peterson Co. at Denver as a sales engineer. He will travel the Rocky Mountain territory as representative for the electrical products handled by Peterson.

► Hamilton Associates of Denver has been named agent in Colorado, Wyoming and New Mexico for Ha-



"They've finally decided that letting G.E. uprate one is a better idea!"

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vens Structural Steel Co. of Kansas City, Mo. Harold H. Klingenberg of Hamilton says his firm will handle steel substations made by Havens, which has not had an agent in the territory before.

► Summer visitors to cool Colorado include Leo H. Lipscomb of Philadelphia, sales vice-president for I-T-E Circuit Breaker Co. He scheduled the first two weeks in July for a Colorado vacation and paid a visit to the Denver branch.

► Consolidated Parts Inc., Denver-based firm that opened a branch in San Jose, Calif., last February, has expanded into Utah and Idaho. Leo Robidoux, president, said his firm had become affiliated with Stuart Electric Co. of Salt Lake and the name of Consolidated Parts of Utah has been filed. Don Stuart will serve as manager of the Utah-Idaho operation. Consolidated specializes in industrial electrical renewal parts. The Salt Lake City branch is at 31 E. 15th South.

► Joe Vivian, vice-president and general manager of Everett T. Vonier Inc., reports enthusiastic response in the mountain area to a new series of quiet switches manufactured by Arrow-Hart & Hegeman Electric Co., Hartford, Conn. Vivian said the new switches operate on a push-button principle and fit standard plates.

► Wyoming members of the National Electrical Contractors Assn. held their annual outing and workshop at Estes Park, Colo., in June. In between study sessions the 50 delegates competed in fishing and golf. Ken Maddox, NECA statistical analyst from Washington, D. C., who was a principal speaker, carried away the golf trophy with an 81. Roy Hanson of the F. W. Fitch Electric Co., Cheyenne, won the fishing contest with a 2½-lb trout snagged in the Big Thompson River.

► Black Hills Power & Light Co. and Rushmore Generating & Transmission Electric Cooperative joined June 13 in dedication of a new 16,500-kw steam generating unit at Black Hills' Kirk plant near Lead, S. D. The unit, owned by Rushmore and leased by Black Hills, was installed at a cost of $3,500,000. The construction was financed through the REA by Rushmore with Black Hills contracting for installation. Black Hills has leased the unit from Rushmore and will sell power to the cooperative for use by its six members. Excess capacity will be available to the power company for sale to its customers.

Pacific Southwest

JUDGING from attendance records and the number of manufacturers who displayed at the Western Air Conditioning, Heating and Refrigeration Exhibit & Conference held May 4-8 at Shrine Exhibition Hall in Los Angeles, the event was a great success. A total of 7,286 persons registered during the show and approximately 176 manufacturers displayed their lines either directly or through manufacturers' representatives. While the promotion was geared primarily to the 11 Western states, there was attendance from all 48 states, and six from foreign countries. Los Angeles attendance records showed 1,754 persons at the event. According to Fred J. Tabery, exhibit manager, 85% of the exhibitors indicated a desire for continuance of this Western event.

► Hal Strahn, a Los Angeles Department of Water & Power lighting consultant, won the regional award in the "My Most Interesting Lighting Job" contest. His entry was a lighting job undertaken for the White Memorial Church, Los Angeles. The work involved lighting the dome, which measures 170 ft across at a height of 70 ft from the floor. Hal used perimeter lighting in three intensities. He will now enter the national competition scheduled in September at Atlantic City.

► Another Water & Power man recently honored was Samuel B. Morris, consulting engineer, recently named a Fellow in AIEE.

► S. W. Scott, Pacific District Manager of Graybar Electric Co., Los Angeles, recently announced plans for the construction of new office and warehouse facilities, to be located in Van Nuys. The new location will include 47,000 sq ft of warehousing space plus new office and display center. Stock to be shipped from this site will include utility, industrial and contractor material, as well as appliances, communication and electronic equipment, which will be shipped directly here from eastern factories.

► Congratulations to the new officers of the Electric Club of Los Angeles, elected at the May 27 meeting. President is Richard L. Engel of Allis-Chalmers; first vice-president, William B. Meek, Westinghouse Electric Supply; second vice-president, George N. Hawley of Southern California Edison; third vice-president, Theodore M. Blakes-

lee of Los Angeles Department of Water & Power; secretary-treasurer, Albert W. Tracy of Anaconda Wire & Cable; and sergeant-at-arms, L. Dean Fowler of General Electric Co. Elected to the executive committee were George Larsen, a past-president of the club, from Larsen-Hogue Electric Co.; Theron M. Goodrich of Pasadena Light & Power; O. J. Paul of Ralph M. Parsons Co.; Howard W. Seidell of Pacific Tel and Tel; and Robert A. Young of Robert A. Young and Co.

► Sam Mesick of Los Angeles Wholesale Electric Co., and vice-president of NAED, attended the national convention held at the Sheraton Park Hotel in Washington, D.C., May 27-29. Sam also extended a special invitation to NAED's eastern membership present at the event, to attend the National Golden Jubilee Convention to be held in San Francisco in June 1958. Mesick stated that NAED is one of the oldest trade organizations in existence. Present at the Washington meeting were the following Pacific Coast members:

From Los Angeles—W. B. Meek, Westinghouse Supply Co., Clarence Kluttz of California Wholesale Electric Co., James H. Hrabetin of Gough Industries, David Bass of Jarvis Supply Co. and Jack Payne of Jack Payne Co.

North Hollywood—E. L. Dyer, Dyer Electric Supply Inc.

Arcadia—L. A. Zima of Zimco Electric Supply.

Fresno—Don Hopkins of Electric Suppliers Inc.

San Diego—David Engel of Sunlight Electric Supply Co., Fred D. Goss of Electric Supply Distributors Co. and Ralph Rohrbach of Pacific Wholesale Electric Co., a delegate of the convention.

San Francisco—Earl Morton of Westinghouse Electric Supply Co. and William Jewel, Pacific zone manager for NAED.

Seattle—Bert Wiegenstein of Westinghouse Supply, Jim Hartwig of North Coast Electric Co.

► Roy Otey has been added to the staff of Sangamo Electric Co. of Los Angeles as sales engineer for electronic components. He will represent Sangamo in southern California and Arizona. He was formerly sales office manager at Sangamo's Ordill Division, Marion, Ind.

► Jack Payne Co. also announced recent expansion of its warehousing facilities of some 3,000 sq ft through lease of a new location near the main office.

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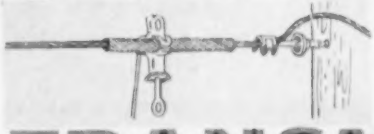

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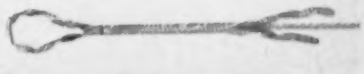
Protect wire coverings and prevent tree abrasion to overhead lines.

FANNGRIPS

Made of galvanized steel, aluminum alloy or copperweld. Powerful non-slip grip makes them ideal for conductor dead-ending, guying or for service drops.



FANNER Superformed PRODUCTS

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WRITE FOR LITERATURE

THE FANNER MANUFACTURING COMPANY

Electrical Products Division

Fine Fanner Superformed

BROOKSIDE PARK • Established 1894 • CLEVELAND 9, OHIO

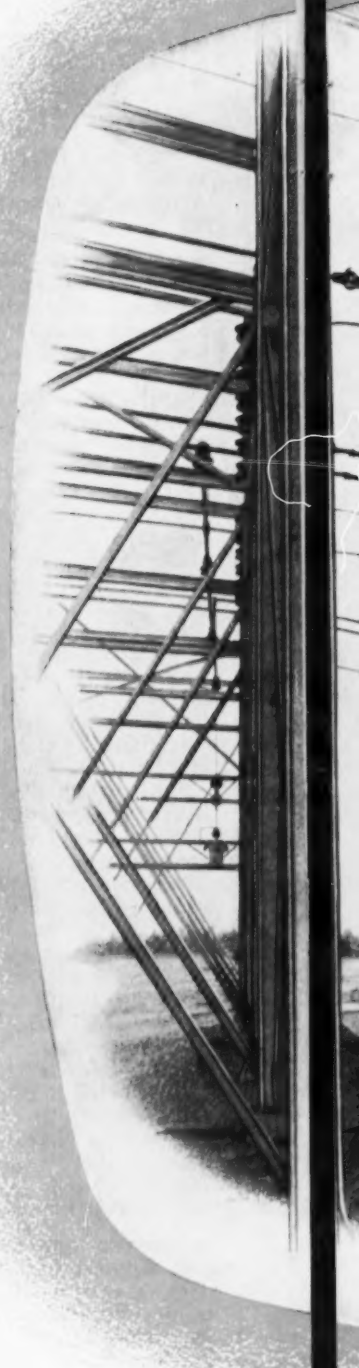
Telephone: SHadyside 1-6000

AGENTS and DISTRIBUTORS IN PRINCIPAL CITIES

* NOW . . . through its Plastic Division, FANNER offers a wide variety of INSULATING TUBINGS and MOULDINGS for electrical purposes.

An example of Allis-Chalmers

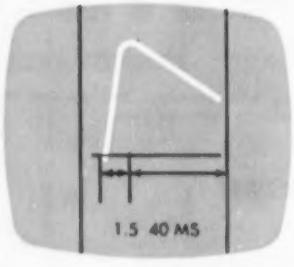
world's first 600,000-kva transformer bank



These three 200,000-kva, single-phase power transformers are now in service. Three duplicates are operating on the other end of a 345-kv transmission line.

Features of these transformers include:

- Corona-free design — prevents insulation damage due to corona. Testing included new switching surge test at 930,000 volts.
- Bank is rated 360,000 kva self-cooled, 480,000 kva with first set of fans, and 600,000 kva with a second set of fans.
- Lighter weight — Heavy plate aluminum in core and coil construction cuts shipping weight.



Tested for freedom from corona and switching surge capability

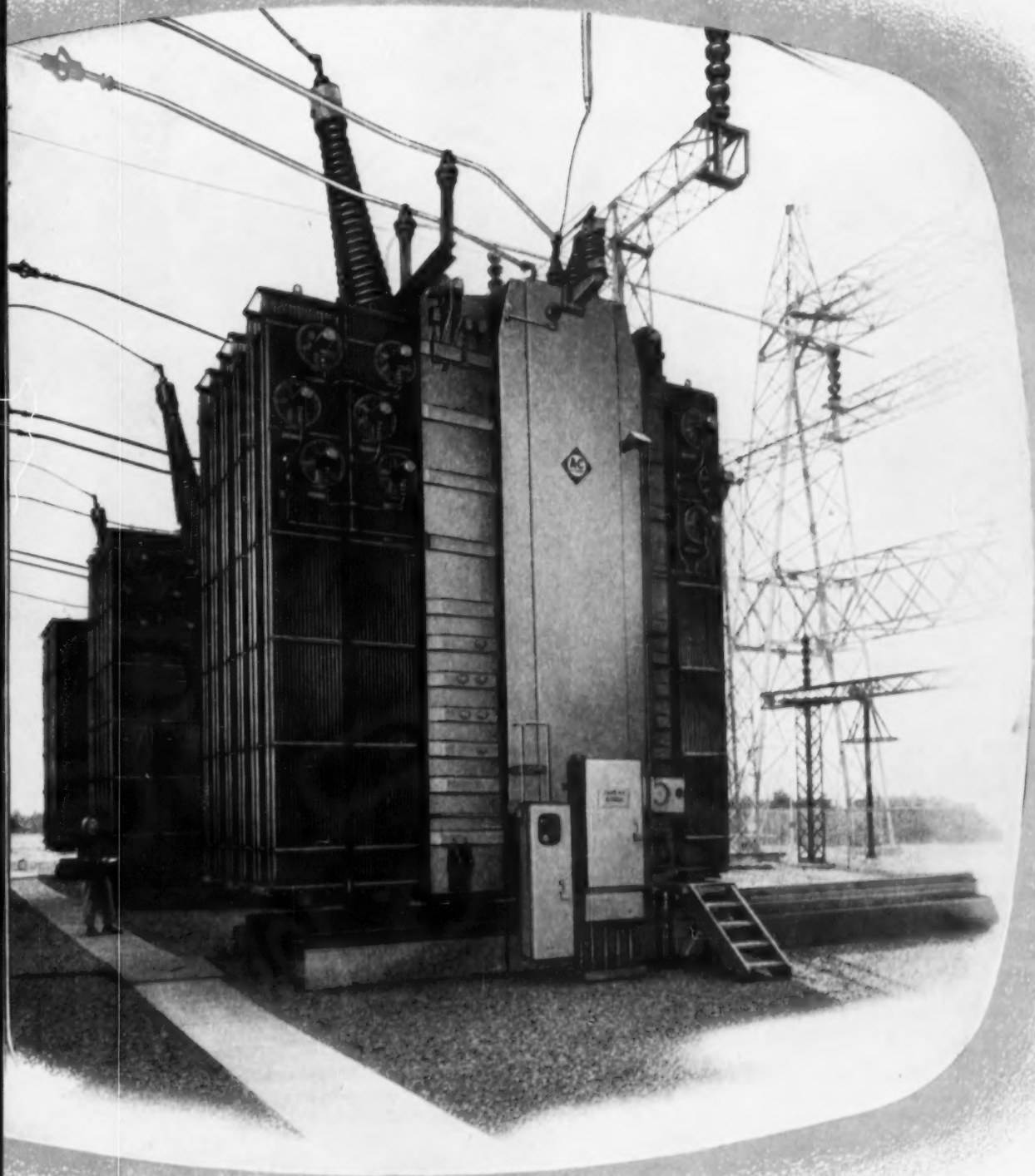
Use of aluminum cuts shipping weight

These units are examples of Allis-Chalmers leadership in helping power systems meet increased demands for power.

For information regarding latest transformer developments, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

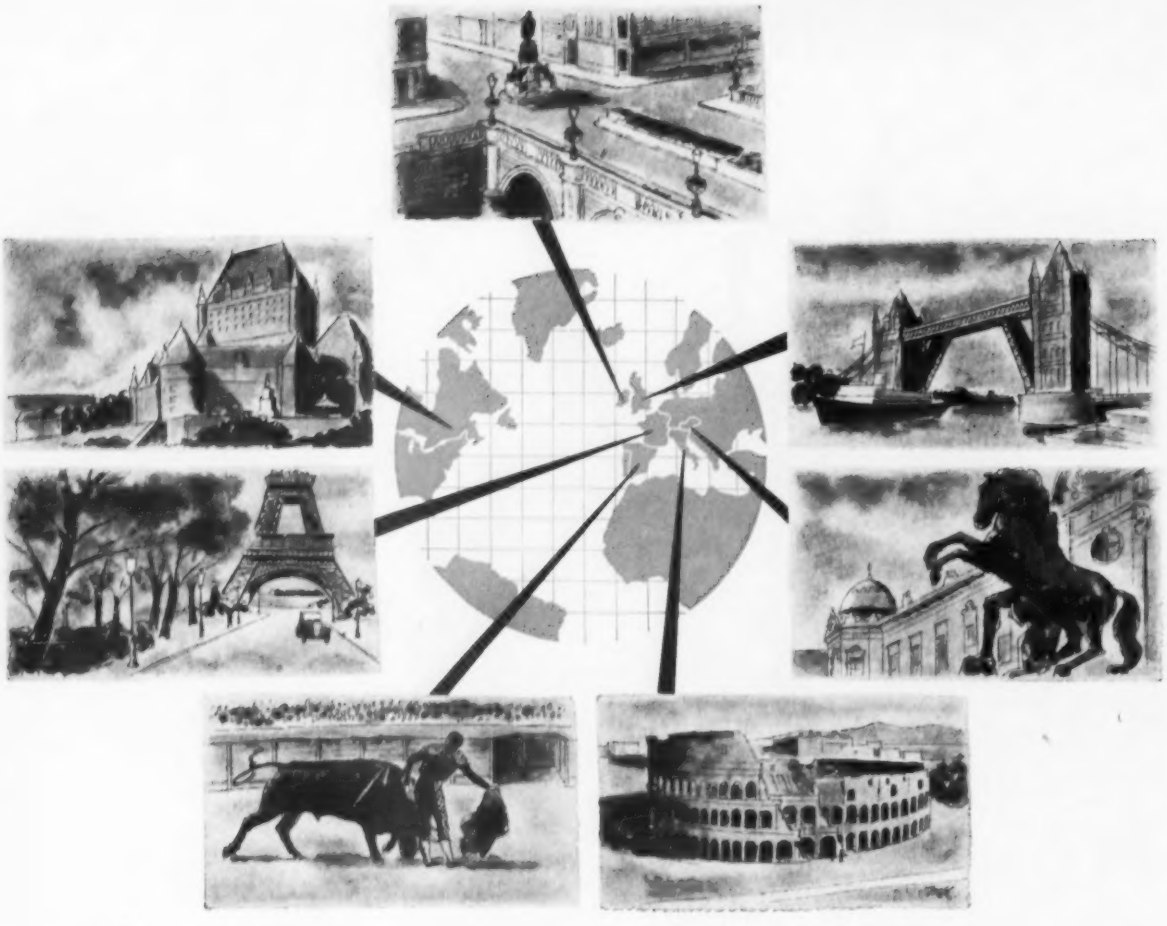
ALLIS-CHALMERS

leadership in transformers



A-C
ALLIS-CHALMERS

A-5407



Here, too, we make Nichrome*

Perhaps you didn't know that the world-famous alloy Nichrome is produced not only in The United States, but also in 6 Driver-Harris plants in England, Ireland, France, Italy, Austria, Spain, and in Canada by The B. Greening Wire Company. Also, Nichrome is a registered trade-mark in 55 nations.

At first, fifty-odd years ago, we manufactured electrical resistance alloys for furnace elements and domestic heating appliances only. Today we produce 132 different high nickel alloys in many different forms and in hundreds of sizes, for almost every kind of domestic and industrial application—of which Nichrome is the most illustrious.

Whenever you buy Nichrome, you are assured of the unsurpassed and unvarying *quality* which has made Nichrome the supreme world standard for electrical-resistance and heat-resistant alloys. This uniformly high quality, which we jealously guard as our most priceless possession, results from the technical excellence, the productive skill, and the quality controls the Driver-Harris craftsmen have gained in over 50 years of experience—and which are maintained with equal rigor in all Driver-Harris plants here and abroad. The result is a continuous benefit to the entire electrical, electronic, and heat-treating industries.

*T.M. Reg. U. S. Pat. Off.

Nichrome is made only by

Driver-Harris COMPANY HARRISON, NEW JERSEY

Manufacturing plants also in: ENGLAND • CANADA • IRELAND • FRANCE • ITALY • AUSTRIA • SPAIN

MAKERS OF THE MOST COMPLETE LINE OF ALLOYS FOR THE ELECTRICAL, ELECTRONIC, AND HEAT-TREATING INDUSTRIES

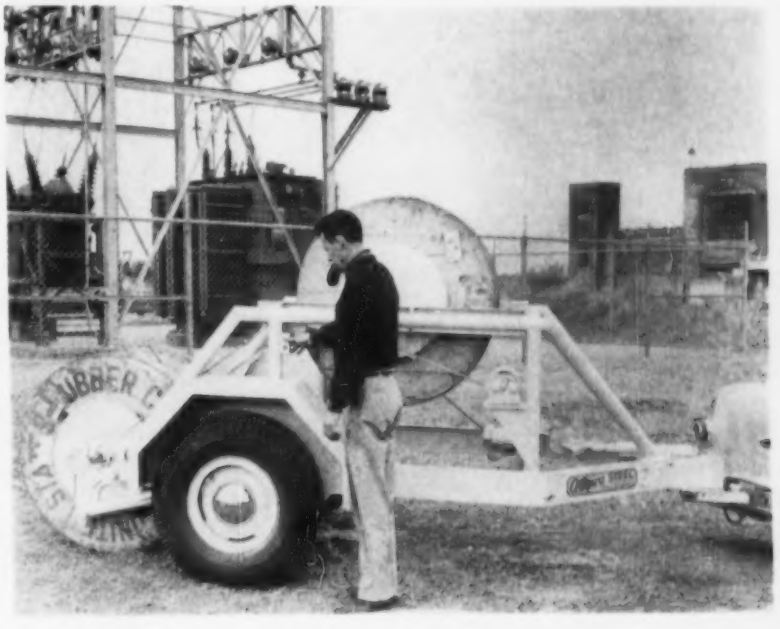
PRODUCT NEWS

New Designs and Applications

Reel Trailers

(1) *Ottawa Steel Division, L. A. Young Spring & Wire Corp., Ottawa, Kan.*

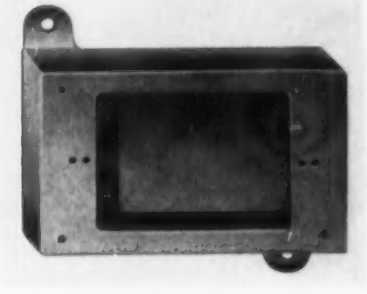
A complete line of safety reel trailers, including models to handle from one to four reels at a time, has been introduced by this company. Multiple reel models with lifting capacities of 3,500 lb per reel have been designed to handle all sizes of spools of electric cable. Pickup arms lower to 12 in. above ground. Will handle spools from 24 in. to 54 in. diameter without special attachments. Friction brakes on each reel provide controlled friction for tension stringing. Available with hand-powered, electric or hydraulic winches for lifting. Designed for one-man operation.



Joist-Wire Duct

(2) *Ceco Steel Products Corp., 5601 W. 26th St., Chicago 50, Ill.*

Underfloor electrification and open web steel joists are combined in a new product of this company. It is essentially a short span, open web steel floor joist with the conventional top cord replaced by a hollow duct. Wiring can be brought up through the floor at any point.



Fittings with Lugs

(3) *Killark Electric Mfg. Co., Vandeventer & Easton Ave., St. Louis, Mo.*

Series FS and FD fittings of this company now have aluminum lugs for mounting. The fittings are available in single to five-gang designs in many styles.

Covered Aluminum Conductor

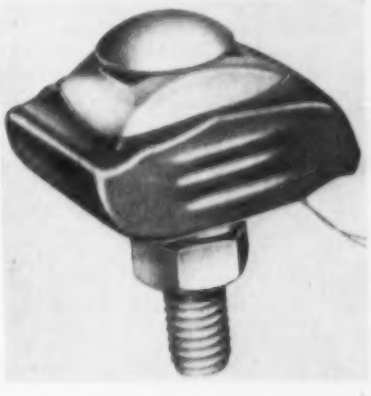
(4) *Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.*

Polyethylene - covered aluminum conductor is a new product of this manufacturer. In production, and available now, are stranded conductors and single wires in a wide range of sizes. All are covered with a relatively thin layer of insulating polyethylene. Thickness of the coating varies with customer specifications.

Weatherproof Wiring Devices

(5) *Stonco Electric Products Co., 333 Monroe Ave., Kenilworth, N. J.*

Two new series of weatherproof wiring troughs and splice boxes announced by this company are said to be designed to increase floodlighting efficiency in outdoor applications, and to cut costs in initial equipment, installation and maintenance. Made of aluminum, the troughs and boxes have standard ½-in. holes to fit any standard lampholder or fitting.



Compound-Filled Clamps

(6) *Jasper Blackburn Corp., 35 Madison St., St. Louis 6, Mo.*

Parallel-groove clamps prefilled at the factory with an oxide inhibiting compound are now available from this company. The compound is applied to each groove and sealed in with a red plastic band under which is fastened a nylon tear string. Catalog number, wire range and other information is printed on the pull tag.

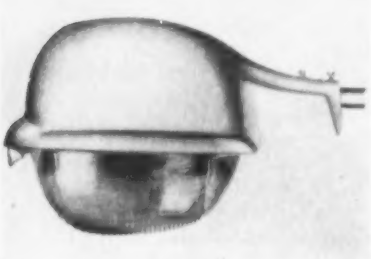
Use Coupon for More Information . . .

. . . See Page 31

Supervisory Control

(7) *Hupp Electronics Co., 743 Circle Ave., Forest Park, Ill.*

Operating on any communication facility acceptable to standard teletype transmission, this new supervisory control system is said to allow more than 1,000 different codes to be transmitted over a single two-way channel. Said to be suitable for remote control of power stations and similar applications where operators can control equipment at distant points and get positive indication that each job is done.



Luminaire for Mercury

(8) *Westinghouse Electric Corp., Lighting Division, Edgewater Park, Cleveland, Ohio.*

This new luminaire is specifically designed to use color-corrected mercury lamps for high-intensity lighting of roadways and other areas. Produces type III IES-ASA distribution with types J-H1, B-H17 and B-H18 lamps. Available with either 1¼-in. or 2-in. end mounting for direct attachment to standard poles.

Threading Chuck

(9) *Mercury Hydraulics Inc., 2440 Blake St., Denver 5, Colo.*

On-the-job threading of pipe or conduit nipples of any length is now possible with the use of a chuck available from this company. It works with either hand threaders or power drives. The tool is said to permit making nipples of any length with no "dead" spots to prevent threading. Descriptive literature is available.

Detergent Diesel Fuel

(10) *Standard Oil Co. of California, 225 Bush St., San Francisco 20, Calif.*

Development of a new detergent-action diesel fuel that retards rusting, reduces fuel consumption, cuts smoke and increases long-term engine power by keeping diesel injectors clean has been announced by this company. The company reports that the new fuel has undergone nearly 4,000,000 miles of road tests with satisfactory results.

Colored Sheathed Cable

(11) *Triangle Conduit & Cable Co. Inc., Box 711, New Brunswick, N. J.*

A metallic green finish distinguishes this company's Triex cable with ground from the silver color of Triex without ground. Cartons are similarly color coded. Aids with stock identification, electrical inspection.

Air Circuit Breakers

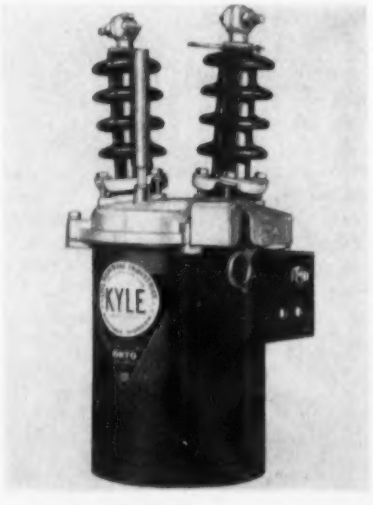
(12) *Hope Electrical Products Co. Inc., 30 Long Ave., Hillside, N. J.*

This company is enclosing I-T-E Cordon circuit breakers in NEMA IV, VII and IX molded case enclosures. The units are said to provide fault protection up to 100,000 rms amp. Operating features of molded case circuit breakers are combined with current limiting Chase Shawmut Amp-Traps in the single unit.

Protective Meter Cover

(13) *Electronic Development Laboratories, 71 Nassau St., New York 38, N. Y.*

A transparent protective meter cover for Simpson instruments, models 260, 303, 276 and 880, is available from this company. The protective shield is said to prevent damage to meter glass, case and movement from dropped tools, etc.



Oil Sectionalizers

(14) *Line Material Industries, 700 W. Michigan St., Milwaukee 1, Wis.*

High continuous current and short time current ratings of these new automatic oil sectionalizers are possible because of a new contact design. Continuous current rating increase is 180%, from a former maximum of 50 amp to a new high of 140 amp. Short time current ratings range to 1,800 amp for 10 seconds, 4,000 amp for one second and 6,500 amp of momentary asymmetric current. Sectionalizers are rated at 14.4 kv but can be applied to systems of 2.4 through 14.4 kv.

Your Westinghouse representative can prove...

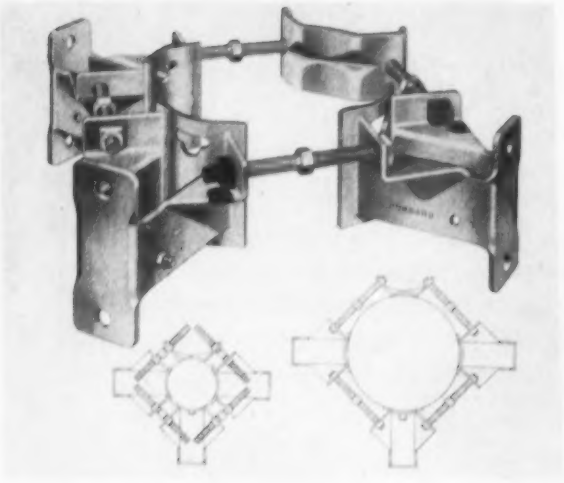
YOU GAIN 12"-17" HOT LINE CLEARANCE

and eliminate pinched fingers with new, exclusive Westinghouse eyebolt, I-beam mounting (3-50 kva). Forged steel eyebolt seated in forged steel I-beam. Tensile strength is independent of cover. Every transformer is production-line pull-tested for 200% safety factor.

YOU CAN BE SURE...IF IT'S

Westinghouse

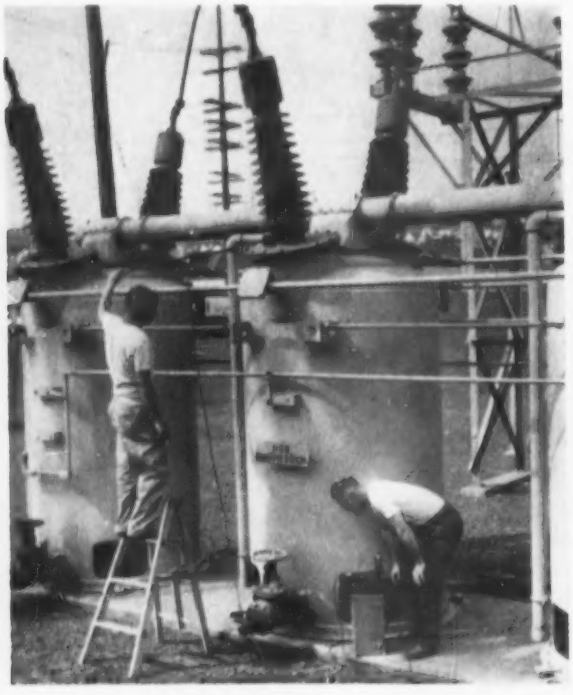
Jack McQuillan, Director of General Services, West Penn Power, and Don Burns, Westinghouse representative. "The eyebolt construction is a major safety improvement in pole-type distribution transformers" ... Mr. McQuillan. J-70792



Transformer Bracket

(15) *Hubbard & Co., 6301 Butler St., Pittsburgh 1, Pa.*

A new bracket for single-pole mounting of transformers developed by this company consists of one, two or three mounting boxes and quarter plates held together by turnbuckle bolts. The same size bracket will fit poles from 6½ in. to 16 in. diameter. Will support one to three transformers, any size.

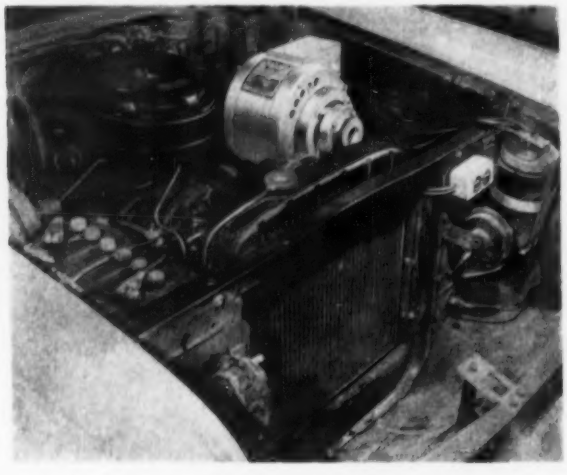


SEATTLE City Light personnel are able to check the potential devices on its high-voltage bushings without taking them out of service. City Light's relay division men, headed by R. J. Lee, designed two pieces of equipment to perform the job. A socket wrench on the end of a hot stick is used to loosen a plug. The plug is removed with a second tool and voltage is then checked

Network Transformers

(16) *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

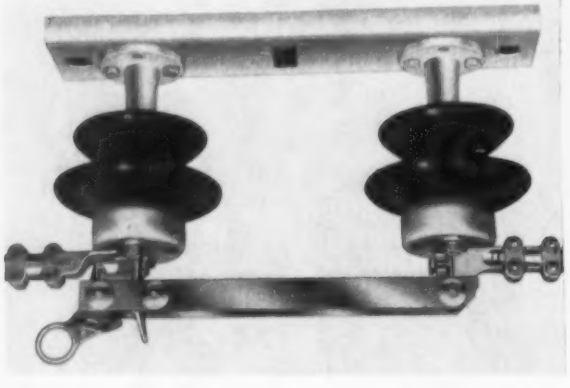
A new line of network transformers being introduced by this company is said to be 20% smaller than its previous designs. Advantages are cost savings in vault construction and substitution of larger ratings in existing locations. The reduced height can allow off-the-floor mounting away from debris and moisture.



Mobile A-C Generator

(17) *Electric Controls Inc., Wales, Wis.*

This company announces production of a heavy-duty electric generator for use with trucks and tractors to provide 115-v single-phase a-c power for auxiliary and emergency power. Capable of operating motors up to 2 hp, the generator is adaptable for use where electric power service is not available.



Distribution Disconnect

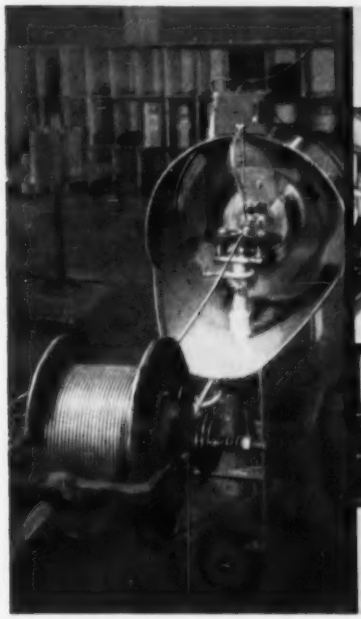
(18) *Southern States Equipment Corp., Hampton, Ga.*

This new hookstick operated distribution disconnect features high pressure line contacts, positive blade latch in the closed position, parallel blade construction, NEMA insulators and integral terminals. Available with steel channel or rolled flange bases, and in ratings of 7.5, 15 and 23 kv. Continuous current ratings are 200 and 400 amp.

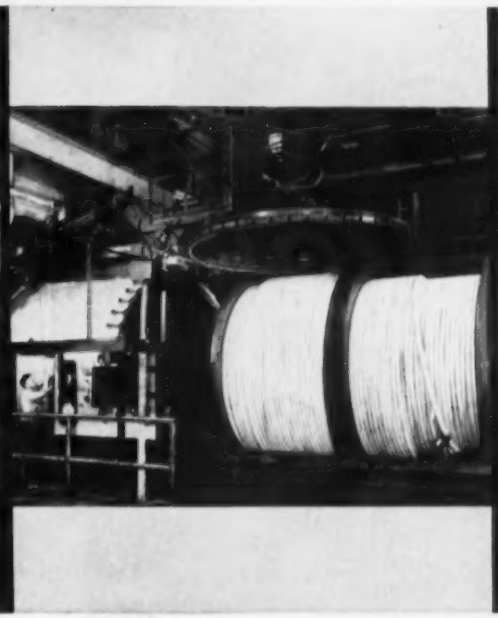
GENERAL CABLE

PAPER INSULATED
VERSATILE · RELIABLE
POWER CABLES

Manufactured at BAYONNE, N. J. • ST. LOUIS, MO. • EMERYVILLE, CALIF.



This machine forms steel strip into helical coil ducts or channels for use in gas filled or oil filled cable.



Impregnating Tank utilized in the heat-vacuum drying and oil impregnation steps in the manufacture of Paper Power Cable.

Large Cabling Machine used in cabling individually insulated conductors into multiple conductor assemblies.

- **SOLID TYPE**
- **LOW PRESSURE GAS FILLED**
- **LOW PRESSURE OIL FILLED**
- **PIPE TYPE**
  - **High Pressure Gas Filled**
  - **High Pressure Oil Filled**

The excellent operating record over many years and the superior electrical characteristics of paper insulated cable highly recommends its use for all power applications. Paper Power Cable is a predominant type in preference and use for voltages above 5 KV.

General Cable Corporation is equipped with the finest modern facilities for paper taping and with many years of know-how is in a position to supply a high quality product for all low and high voltage applications.

GENERAL CABLE CORPORATION
420 Lexington Avenue, New York 17, N. Y.
Offices and Distributing Centers Coast-to-Coast

for quality and economy... **specify GENERAL CABLE**

YOU SAVE (2) WAYS WITH the right control

There is a right control for every job. By using Furnas Electric controls, cost and space advantages can be yours. Designed for the motor, these controls can save you up to 25% in cost and 40% in space.

Furnas Magnetic Starters are available through Size 4 in 10, instead of the usual 5, different sizes from 1 to 100 hp. This provides "In-Between" sizes, not otherwise available at corresponding price and space advantages.

Drum Controllers — over 1000 models available from 1 to 10 hp for whatever application you require. The durability, ease of operation, versatility and low cost of drum controllers make them adaptable to the majority of applications satisfied by manual control.

Oil Tight Push Buttons for every need. Standardization and interchangeability mean more combinations with fewer parts. Complete accessory line.

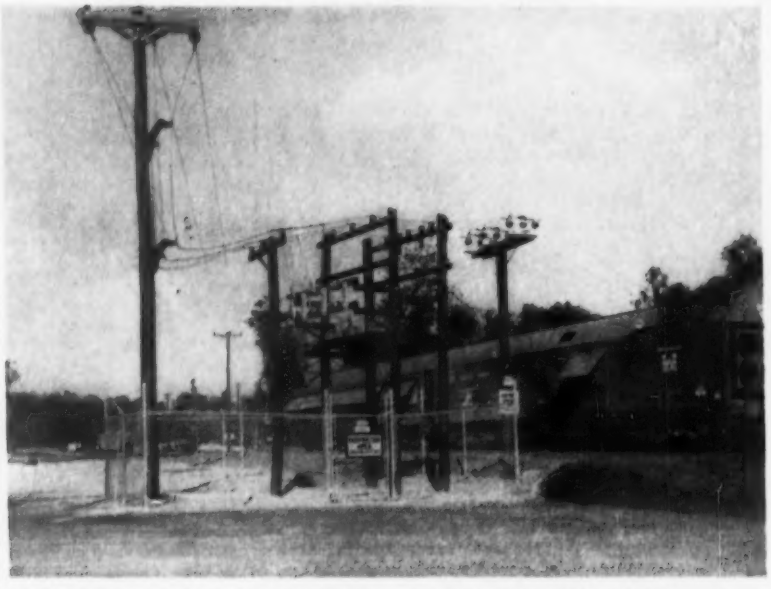
Pressure Switches

Limit Switches

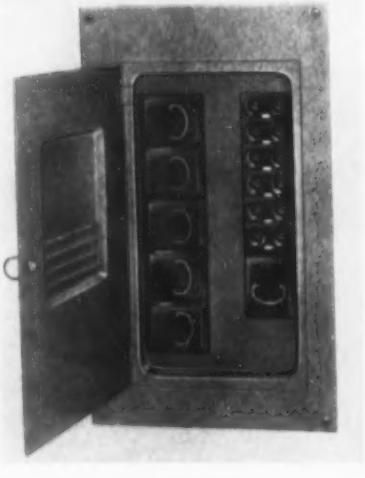
Foot Switches

For more information write for Bulletin 5411, 1082 McKee St., Batavia, Illinois. A36

FURNAS ELECTRIC COMPANY
BATAVIA, ILLINOIS
Sales Representatives in All Principal Cities



DESIGNED and built by Westinghouse Electric Corp., this 5,000-kw railway-mounted gas-turbine power plant has logged well over 5,000 hours of operating time at Ft. Meade, Md. It was built for the U.S. Army Engineers. It is now at the U.S. Army Engineering Depot, Marion, Ohio, where it will be held on stand-by basis



Main and Range Panel

(19) *Federal Pacific Electric Co., 50 Paris St., Newark 1, N. J.*

A new 150-amp parallel-connected main and range panel offered by this company is designed for use in the meter-switch-fuse sequence for 120/240 v, three-wire, single-phase service. The device provides six 240-v parallel-connected pullouts with 12 plug fuse branches, and is UL listed for entrance and loadside service where a main disconnect is not required. Available in general purpose enclosures for either flush or surface mounting. Features dead-front construction.

One-piece Connector

(20) *Jasper Blackburn Corp., 35 Madison St., St. Louis 6, Mo.*

A new, heavy-duty, one-piece connector designed by this company has no nuts, washers, housings or spacer to take apart and assemble. To install, two free bolts are unscrewed. The connector is placed over the main and the tap wire is inserted. Tightening two captured bolts secures the spacer. Connector is adaptable to conductors ranging from 2/0 to 397.5 ACSR and 3/0 to 400 mcm AWG. Ask about the Four-Bolt Connector in inquiries.

New Fuses

(21) *Ward International Inc., 601 S. Vermont Ave., Los Angeles, Calif.*

Sightmaster is the name given to this new multiple service fuse. It has six settings for re-use and a neon light that glows to indicate when a circuit is broken. Overload blows the fuse and the light comes on. When the short circuit is corrected, the fuse is turned to the next setting and is back in service. Screws into standard fuse boxes.

For More Data Fill in Coupon, Page 31

Spar Connectors

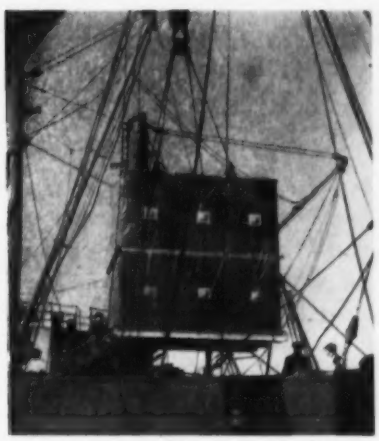
(22) *Malleable Iron Fittings Co., Pole Hardware Division, Branford, Conn.*

For greater flexibility in joining various types of wood pole structures, this company has developed an angle spar connector in two sizes. Design of the fittings permits attachment to round members at any angle up to 90°. Pole contacting surfaces are available to fit a wide variety of diameters, and have teeth and ribs to increase loads that can be transmitted through the connections. The smaller size attaches to the round member with a single bolt; the larger with one or two bolts either for medium or heavy loads.

Dry-type Transformer

(23) *Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

A new and quieter dry-type single-phase distribution transformer has been introduced by this company. Reported new design features are: reduced sound level, decreased weight and size and improved appearance. Core and coils are mounted on a mechanical vibration dampening system to isolate and reduce the basic sound level and eliminate its transmission through rigid conduit.



FLOATING POWER STATION? Yes. For the Creole Petroleum Corp. of Venezuela, General Electric Co. is supplying a cubicle-type oil circuit breaker to be installed on a barge as part of a floating power station. The circuit breaker is rated 34.5 kv, 1,200 amp. Heart of the system will be a 16,000-kv gas turbine-generator being constructed by G-E's gas turbine department in Schenectedy

BUILT TO LAST!

KILLARK Plugs and Receptacles

NEW AND BETTER...

Killark's new Plugs and Receptacles are designed for years and years of service. They offer your customers the trustworthy service they are looking for . . . you the profits you want. Check these made-to-last features:

- Built of special Killark aluminum alloy for longest life, minimum trouble in operation—in many styles.
- Interchangeable with existing equipment.
- Available in either explosion-proof or weather-proof types.
- Choice of sizes—from 15 to 100 amp.

WRITE for ILLUSTRATED LITERATURE

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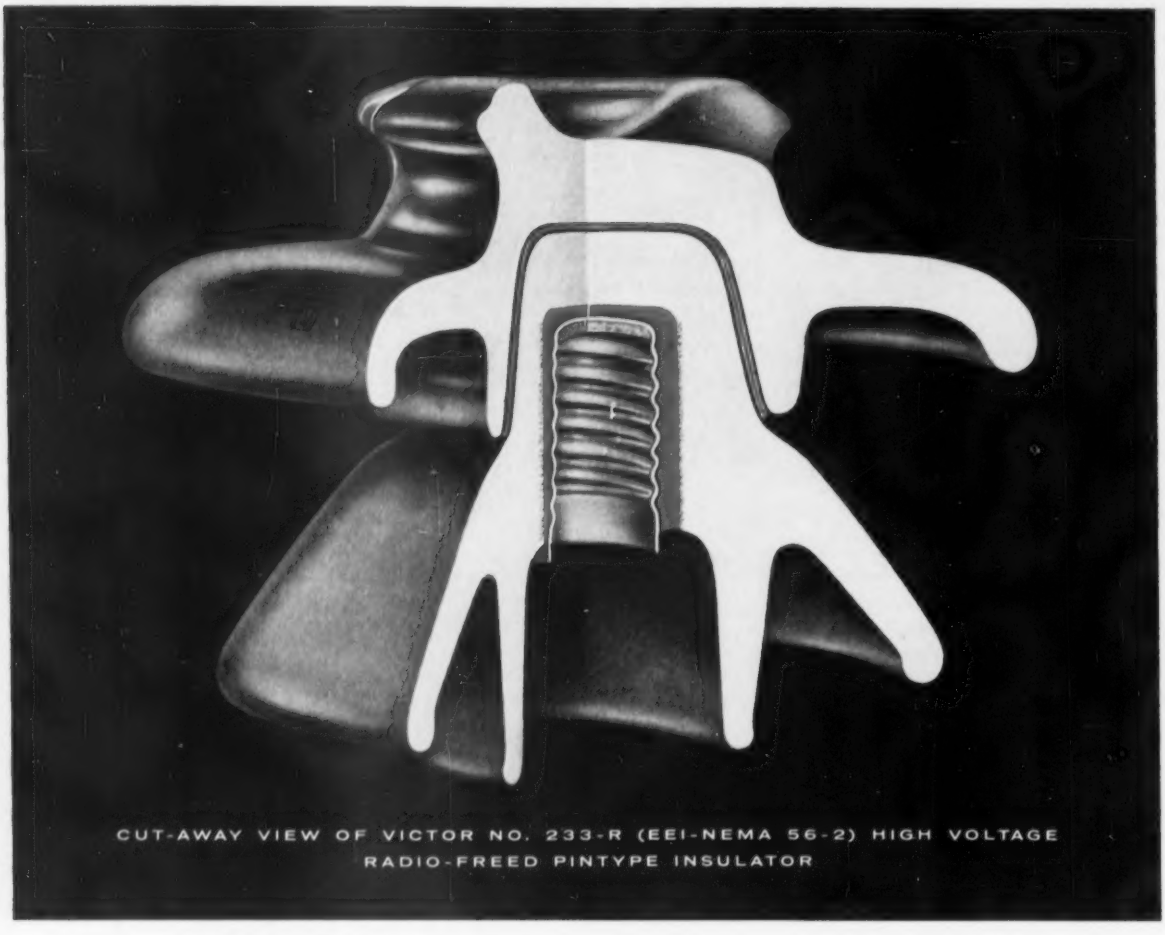
Denver, 1073 Galapago
Kansas City, Mo., 616 W. 26th Street

Killark
ELECTRIC MANUFACTURING COMPANY
3940 EASTON • ST. LOUIS 13, MO.



CUT-AWAY VIEW OF VICTOR NO. 233-R (EEI-NEMA 56-2) HIGH VOLTAGE RADIO-FREED PINTYPE INSULATOR

VICTOR HIGH VOLTAGE PINTYPES COST NO MORE THAN ORDINARY INSULATORS!

VICTOR High Voltage Pintypes are the industry's greatest value! Only with VICTOR do you get premium quality insulators without paying premium prices.

These insulators are laboratory designed, manufactured and tested with the industry's most modern equipment. They are made of VICTOR *Purified* Porcelain—finest insulator porcelain ever made. They are *precision* made. Shells are accurately aligned. Machine-spun zinc thimble assures perfect pin fit. VICTOR'S radio treatment, *distinguishable* and *permanent*, eliminates your radio interference problems.

Scientifically fitted glaze gives added strength and added protection against contamination. Beaded edges give higher impact strength. Each insulator is designed to withstand steep front impulse waves in addition to the normal 1.5 x 40 standard impulse wave. Full size, smooth top and side grooves insure proper conductor seating. When you buy VICTOR, you just can't buy better high voltage pintypes—at *any* price!

Nothing beats Porcelain **FOR ELECTRICAL INSULATORS!**

VICTOR INSULATORS DIVISION

I-T-E CIRCUIT BREAKER CO., INC. • VICTOR, N.Y.

BULLETINS ETC.

(24) **STREET LIGHTING PROMOTION**—A new bulletin designed to aid municipal officials, civic groups and utilities in planning celebrations to mark the installation of new street lighting systems is now available from General Electric Co., Schenectady 5, N. Y. Title is "How to Develop a Light-Up Celebration"; code number is GEA-6462.

(25) **COOLING TOWER** — This company's induced draft counterflow cooling tower is described in a new 32-page bulletin. Construction and operation of major parts and effects of recirculation and surroundings are described. Includes data sheet to help in preparing inquiry. Ask for Bulletin CT-57-1, Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.

(26) **ELECTRIC PROGRAM**—A booklet entitled titled "1957 Power Supplier Materials for 4-H Electric Programs" has been published by Westinghouse Electric Corp. It is a catalog of material available from the company that will aid with teaching the use and care of electrical equipment on the farm and in the home. Ask for B-6528. Address is 11-L-22, Power Use Department, East Pittsburgh, Pa.

(27) **CAPACITORS** — Ohio Brass Co., 380 N. Main St., Mansfield, Ohio, has published its initial catalog dealing with the new Varex capacitors and accessories. Copies are available.

(28) **GALVANIC PROTECTION**—Two reference manuals describing the use and application of zinc as a galvanic anode to protect iron and steel from corrosion have been published. Requests should be addressed to American Zinc Institute, 60 E. 42nd St., New York 17, N. Y. One deals with underground applications, the other with underwater applications.

(29) **OUTDOOR LIGHTING**—Bulletin 56078, entitled "Outdoor Lighting—Industrial and Commercial Applications," is available from Line Material Industries, 700 W. Michigan St., Milwaukee 1, Wis. The bulletin explains the use of fluorescent, incandescent and mercury vapor equipments for lighting outdoor commercial facilities or areas. Information about accessories such as ballasts, brackets and standards is included.

(30) **LARGE STEAM TURBINES** — Advances in the field of large steam turbines is the subject of new literature based on a paper by C. D. Wilson, chief turbine design engineer of Allis-Chalmers' steam turbine department. The paper was presented at the annual meeting of the American Power Conference. Copies are available by writing Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Ask for 03R8620.

(31) **POLYETHYLENE INSULATION** — A conference paper presented before the 1957 winter meeting of the American Institute of Electrical Engineers is available in booklet form from Rome Cable Corp., Rome, N. Y. Title is "Polyethylene for Higher Voltage Cables." It was written by Robert C. Graham, chief engineer of the company.

(32) **MOTOR PROTECTION**—The new type TS motor protecting relay of Electrical Service Co., Ardis Heights, Greenville, Tex., is described in a pamphlet offered by the company. Contains full information on application, operation and installation.

(33) **FLUORESCENT FIXTURE** — Folder form 3-1256 issued by the Fullerton Mfg. Corp., Box 110, Norwalk, Conn., illustrates the company's new Quentin fluorescent fixture. Folder shows lighting application and gives construction details.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after September 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 78 29 30 31 32 33

If described in advertising, fill in page number

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

NAME ..... TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

CEILHEAT Means Heating Comfort!
and comfortable profits
10 new baseboard heater models
10 fine wall-insert heater models
7 outstanding portables — plus famous guaranteed radiant cable
CEIL HEAT
CEILHEAT, INC.
5212 HOMBERG DRIVE, KNOXVILLE, TENNESSEE
NEW WEST COAST SALES OFFICES:
LOS ANGELES: Grove Montaport 1821 Montana Street
SAN FRANCISCO: G. M. Howard & Assoc. 1301 6th Street
PORTLAND: Pacific Northwest Agents, Inc. 646 N. Thompson Street

Now for "Preferred-Emergency" Switching

an Off-the-Shelf

AUTOMATIC TRANSFER PANEL

With *Any Desired* Throwover Scheme ... at the *Flip of a Switch!*

A Flip of the Switch Gives You:

- Choice of making either source preferred.
- Choice of automatic or manual (semi-automatic) return.
- Adjustable time delays —range up to 10 minutes.
- Optional manual operation of line switches.
- Choice of returning: in either open or closed transition (with or without paralleling).
- Optional lockout on bus faults.

Other Unique Features:

- Indicating lamps for switch positions, live sources, and lockout action.
- Alarm to prevent leaving panel set on "manual operation."
- Transparent cover over selector switches prevents unintended changes in settings.

You don't have to design and build (or negotiate for) — your special automatic transfer panels in order to get the special specific throwover schemes you need. The new S&C Automatic Transfer Panel will give you any or all throwover options... selector switches give the scheme you want!

With this new stock panel you can eliminate the engineering and correspondence involved in getting custom-built panels.

Furthermore, you are sure of getting what you want today; tomorrow you can change your mind, and later you can revise the scheme—still using the same transfer panel. Imagine! You can order your panel ahead of time, before specifications are settled.

Saves Time and Money

— Buy from our stock for your stock —

Specialists in High-Voltage Circuit Interruption since 1910

S&C ELECTRIC COMPANY

4425 RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS, U. S. A.

In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario

POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

JULY 1957

ELECTRICAL WEST SALES GUIDE

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

What about load building?

Load building activities in Seattle may be a thing of the past if the city accepts a curtailment policy recommended by a firm of management consultants after a five-month, $104,000 study. City Light probably would discontinue its subsidy on installation of ranges and water heaters. The subsidy costs about $130,000 a year and a charge for installation of this equipment should bring income of some $40,000 annually, it is believed. City Light's allowance of $35 for the installation of each electric range and $20 for each electric water heater replacing flame-type equipment has placed electricity in a dominant position for these services and has proved an effective load builder, City Light officials say. The utility has made no service fee for most range and water heater repairs, simply charging for the necessary parts. (See news section, p 133 for details of suggested reorganization.)

Now it's remodeled models

Better Your Living At Home is a program being sponsored by the San Francisco Chamber of Commerce this summer to encourage home modernization. Recognizing the pull of model homes, the sponsors will open a minimum of four remodeled houses within the city; expects several thousand old home owners to see what remodeling could do for them. Kitchen remodeling, up-to-date laundry centers, adequate wiring, comfortable heating and better lighting will be encouraged. PG and E sales representatives will be on the job to answer questions and develop interest in new equipment and services.

How to do it with light

The Idea Home on Wheels, which was sponsored at the San Diego Bureau Spring Fair by San Diego Gas & Electric, was in Oregon in June, under sponsorship of Portland General Electric. The traveling display, fitted out by the Superior Electric Co. in a motor coach and trailer, has six miniature rooms showing more than 30 ways to decorate the home with light. Featured are the Luxtrol 360-w home-type dimmers for dialing degrees of light. In advance notices to contractors, home builders and commercial customers, Chester W. Jarrett, manager of PGE's illumination department, pointed out that the company was sponsoring the exhibit because it

believed that it would give valuable support to the electrical industry.

A boost for color TV

Promotion of color TV in Salt Lake City by ZCMI, described on p 123, attracted more than 1,200. General store sales increased and additional prospects for color sets were obtained, but ZCMI hesitates to state just how much of this should be attributed directly to the shows. It may be recalled that the department store broadened shopper contact during 1948 by means of closed-circuit black and white shows. Reaction at that time was that color would have been more effective. (Intra-store TV Experience, EWest, April 1949.)

Catching on at last

Sacramento's Housepower promotion seems to be proving that homeowners are now well aware of the wiring problem and generally intend to do something about it sooner or later. Within two months the Sacramento Municipal Utility District received 1,021 requests for a free wiring checkup. During the same period SMUD representatives completed 979 surveys and reported 813 residences in need of wiring modernization. Owners of 179 of them asked for names of electrical contractors.

Homemakers on TV

San Diego Gas and Electric's Homemaker of the Week TV program is presenting local women in their own homes using their own equipment. This program is proving an effective sales tool.

Win a house at Portland

In Oregon Westinghouse is tying into the KGW-TV Win a House contest sponsored by Wedgwood Homes Inc. and White Satin Sugar. Wedgwood Homes builders and their suppliers are putting up the first prize of a $16,500 home in Oswego Highlands, Portland suburb, and Westinghouse is donating the second, third and fourth prizes—a refrigerator, washer and dryer—as well as traffic appliances for weekly awards. Contest is of the brief essay type; runs from June 10 into September. Westinghouse tie-in was arranged through Stuart Pagett, manager of contact sales for WESCO, and brings in Harold Partlow, manager of major appliance sales, and Frank Dunn, head of the traffic appliance department.

Promote with crime clues in Phoenix...

Dealers in the Phoenix area are donning Sherlock Holmes caps for the Crimes in the Kitchen freezer promotion sponsored by Appliance Merchandisers Assn., Arizona Public Service and Salt River Power District. Designed to push sales of freezers and two-temperature refrigerators, the campaign includes a store traffic building contest. Customers will be asked such questions as "What shrunk the shrimp?" Newspaper ads will give two clues on various kitchen crimes in a coupon to be filled in and deposited at a dealer

store for the prize drawing. There are 320 frozen food prizes, each worth $10, to be given away during the six-week contest.

...with jingles in northern California

Northern California Electrical Bureau has a jingle contest as traffic builder in its July freezer promotion. In addition there will be special prices on certain refrigerator-freezer and freezer models. NCEB will pay customers who buy and then later are found to be winners up to $400 in cash. To encourage salesmen to help shoppers, there will be an award to a salesman for every refrigerator-freezer or freezer winner.

Free trial on fry pan

A 10-day free trial offer on fry pans is being sponsored by NCEB in all areas where PG and E sells only electricity. The June-July promotion will give many their first experience with portable cooking appliances.

Maher retires at Los Angeles

Retirement of Stephen B. Maher as general manager of General Electric Appliance Co.'s southern California branch office and appointment of William B. Frogue to succeed him was announced by P. A. Tilley, GEA president, at a recent luncheon in Los Angeles. Frogue has been with G-E for 12 years, most recently as manager of the St. Louis branch.

Show line

Packard-Bell's annual convention, June 3-4, at the Statler Hotel in Los Angeles was attended by 45 distributors from the 11 Western states. Highlight was the unveiling of P-B's 1958 line.

NATA officers

Fred Egge, Ware & Hosey, was elected president of Northwest Appliance & Television Assn. at Seattle. Jack Stewart, Stewart-Sullivan Electric, is first vice-president; Henry Murray, Henry Murray's, second vice-president; David Lombardo, Organization Service Bureau, executive secretary.

News about people

Harry G. Dumas has been appointed San Francisco zone manager for Easy, covering also Fresno, Reno and Salt Lake...Reg Payne, formerly with Frigidaire in San Diego, has taken over the business of La Jolla Appliance Co. from Abel Le Blanc...Frank Koch has been made Western district manager for Premier Co. of St. Paul. He retired recently from G-E Supply after 32 years...Paul Bryant is now vice-president in charge of sales for Hoffman Radio Division in Los Angeles...Donald Peck has been promoted to Seattle district appliance sales manager for Graybar, in charge of five states and Alaska. ...Other Graybar changes include transfer of M. M. Owen, San Francisco manager of appliance promotion, to Oakland as appliance sales manager and of T. J. LeClair from Minneapolis to San Francisco as manager of major appliance sales.

Frank Falge's monthly progress report on

LIVE BETTER . . . *Electrically*

Residential kwh sales, nationally, passed the 3,000 mark in February and reached a new high of 3,004. This represented an increase of utility revenue per residential customer from $73.84 to $77.80.

A new plateau

The new Live Better...Electrically film, Something Wonderful Happens, was previewed to enthusiastic audiences at the NELPA convention in Vancouver and the PCEA convention in San Francisco.

New film now available

Appliance sales nationally lagged in the first quarter of 1957. Not so, however, in Sacramento, where Sacramento Municipal Utility District's strong 1956 promotional program carried on into 1957. Electric range sales were up 67%, dishwashers up 55%, garbage disposers up 63%, electric dryers 50%, freezers 15%, automatic washers 20% and room air conditioners 108%.

People are Living Better ...Electrically in Sacramento

R. H. Macy & Co. staged the biggest Live Better... Electrically retail promotion to date in its six New York department stores. It featured many full-page ads and lasted a week.

Biggest retail promotion

Electric heat pumps, 1,535 of them, won out in competition to make the new homes at Little Rock Air Force Base comfortable and livable. All homes also had all-electric kitchens.

Make life more livable

Electric House Heating Equipment Section of NEMA, 155 E. 44th St., New York 17, has excellent material on house heating including an 18-minute sound slide film in color, Heat Your Home Electrically, brochures and "how to" manuals. Electric heating costs are lower than you think. More than 300,000 people are now doing it.

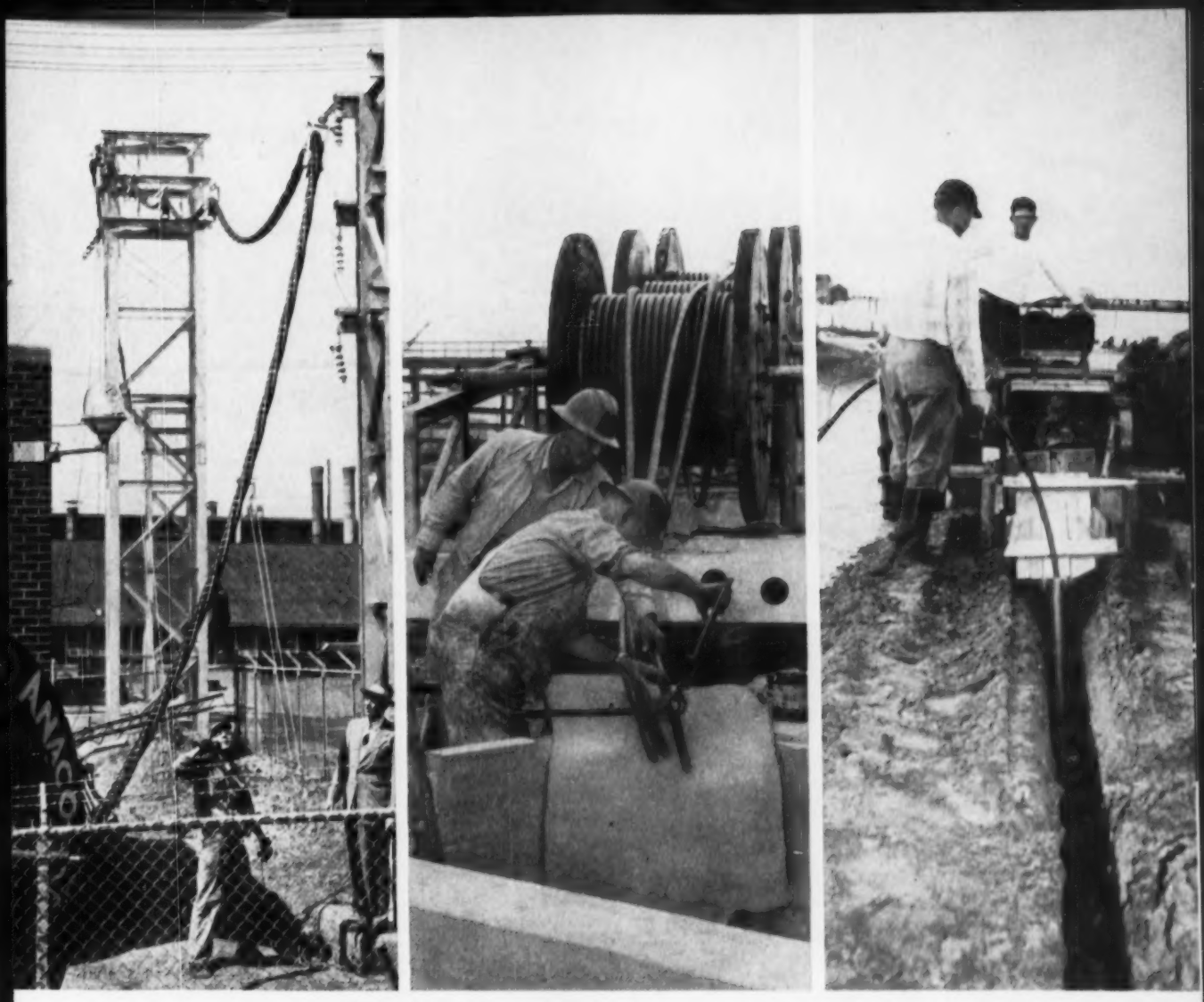
To Live Better ...Electrically Heat Better... Electrically

Here are just a few of the newest ideas to help people Live Better...Electrically: heated gloves, filmed recipes that flash on the wall, electric can openers, foot-operated doorbells, a dryer that folds clothes, a sewerless electrical toilet and home closed-circuit television.

Have you seen these?

The 1957 International Lighting Competition sponsored by McGraw-Hill publications with the cooperation of the National Lighting Bureau of NEMA is under way with closing date Oct. 25. Residential and outdoor lighting are included.

Have you entered?



Overhead . . . in ducts . . . underground

Order one cable for all three jobs . . . Anaconda Durasheath

Overhead . . . in ducts . . . underground. Use Durasheath* neoprene-jacketed cable for every type of power application up to 15 kv. Tough jacket resists weather, soil acids, abrasion, mechanical injury.

One continuous run without splices. Run Durasheath from underground, to overhead, to ducts, *in one length* without splicing. Light, flexible, it handles easily. Costs less to install.

Stock one cable instead of three. You save space, paperwork with all-purpose Durasheath. One cable does the work of three. You cut inventory. Versatile Durasheath excels everywhere.

See the Man from Anaconda or your Anaconda distributor for full information. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Trade Mark

FASTEST WESTERN SERVICE — At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for *every type of application.* Anaconda's Western Distributors thus can assure the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.

LIVE BETTER ELECTRICALLY

ASK THE MAN FROM **ANACONDA®**
FOR **DURASHEATH CABLE**

ANNOUNCING
A COMPLETE NEW LINE

IT PAYS TO HAVE HUBBELL QUALITY CONNECTIONS

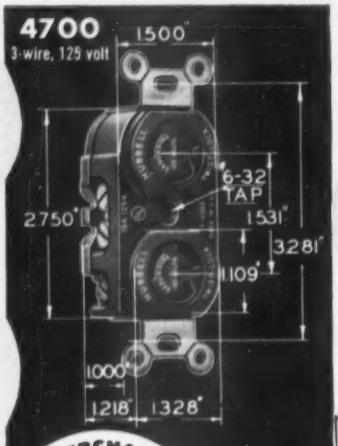
Twist-Lock®
approved for GROUNDING purposes only!

A COMPLETE NEW LINE . . . NON-INTERCHANGEABLE with REGULAR "TWIST-LOCK" UNITS

GREEN HEXAGONAL GROUNDING SCREW.

ALL UNITS IN DISTINCTIVE BROWN COLOR.

4700
3-wire, 125 volt

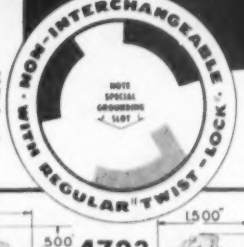


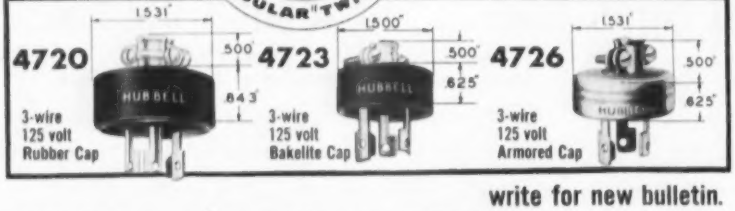
3-WIRE, 15 AMP., 125 VOLT

FOR APPLICATIONS that require POSITIVE GROUNDING plus POSITIVE LOCKING.

3-wire, 125 volt
4730
Connector Body

Elbow-shaped grounding slot prevents insertion of regular "Twist-Lock" caps. Accepts 4700 Series Caps only.





write for new bulletin.

FIRST . . . and still the FINEST!

HARVEY HUBBELL, INC.
BRIDGEPORT 2, CONNECTICUT

Sold only through authorized electrical distributors.

QUALITY WIRING DEVICES

LETTERS TO THE EDITOR

Nontoxic

To the Editor:

It has recently come to our attention that in the April issue of ELECTRICAL WEST, in the Contractors' News Letter, there appeared the following:

"Because of some recent fire experiences, the use of acrylic plastic diffusing elements in luminous ceilings may be prohibited by the California State Fire Marshal's Office. Not only has this material been found to support combustion, but when burning it produces toxic fumes, also considered to be a hazard to the fire fighting forces."

We have checked with the California State Fire Marshal, and he has informed us that he has no knowledge of any information on which such an item could have been based.

The acrylic plastic most commonly used as diffusing elements in luminous ceilings is Plexiglas, which is manufactured solely by Rohm & Haas. Extensive and continuing tests have demonstrated that Plexiglas does not produce toxic fumes when burning and is hence not a hazard because of such fumes.

Naturally our company is most disturbed about the derogatory and untrue statements in this item as applied to Plexiglas, which is the major acrylic plastic used in diffusing elements in luminous ceilings, and the damage done to the market for Plexiglas.

Rohm & Haas

You're right and we're sorry that we quoted a statement without full verification. Further checking reveals that the California State Fire Marshal has no information supporting the statements made in the news item. Just to set the record straight, the U. S. Bureau of Mines and independent testing laboratories have made reports establishing that the fumes produced by acrylic plastics are no more toxic or hazardous than those produced by wood or paper when burned under similar conditions. —*The Editor*

Another Definition

To the Editor:

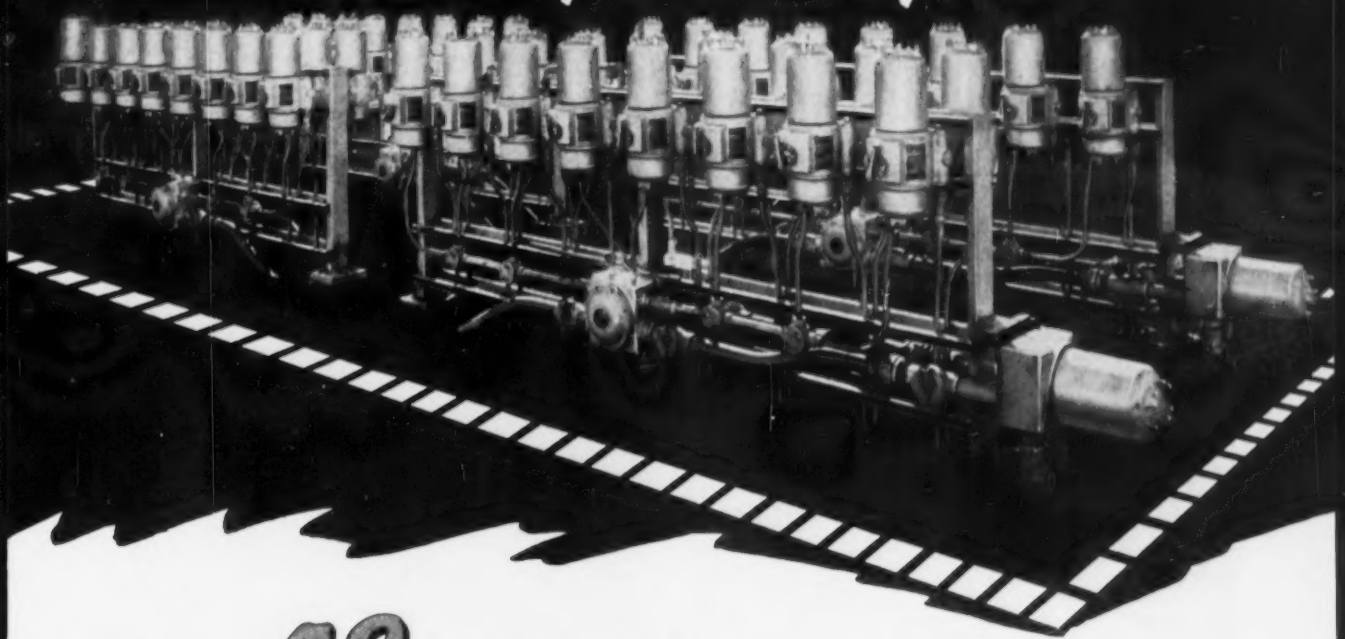
Under the heading of Definitions on the News Roundup page of the March 1957 issue, Senator Richard Richards defined a liberal. In the New York *Times* several years ago a liberal was defined as "A specie of human being characterized by low pressure thinking, high pressure feeling and a constant urge to give away something that belongs to somebody else."

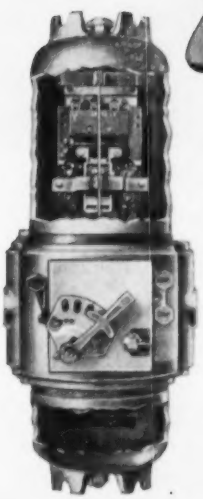
Pierce G. Fredericks
Downtown Athletic Club
New York City

Sales Building *Facts* and *Figures* You Can Use

ELECTRICAL WEST has just completed its latest market survey "How To Get More Sales in the Largest and Fastest Growing Electrical Market in the United States". Write for copy if you do not receive one in the mail.

CROUSE-HINDS
Condulet* motor controls
Occupy Less Space!





48 Explosion-Proof Combination Motor Starters and Circuit Breakers . . . *in a 25 ft. x 6 ft. Area!*

Crouse-Hinds Condulet* Type EPC Motor Starters and Circuit Breakers are explosion-proof, dust-tight (dust-ignition-proof) and weather-resistant (raintight).

Lightweight cast aluminum construction for easy installation without use of lifting equipment.

Seven Conduit entrances simplify installation.

Built-in push button stations and selector switches are available.

Starter sizes 0 to 5. Circuit breakers 50 to 600-amp. frame sizes.

In the installation shown above, 48 Crouse-Hinds Condulet* Type EPC combination motor starters and circuit breakers are compactly arranged in four racks.

If necessary, the 25 ft. x 6 ft. area used could have been cut in half by installing the Condulet motor controls in two tiers. Or, *twice* as many Condulet controls could have been installed in the same area, if required.

The *vertical design* of Crouse-Hinds motor starters, circuit breakers and combinations allows them to be installed only ¼" apart. This compactness produces savings in the construction of steel mounting racks, and in the use of premium floor space.

● **For help in solving a space problem, see your Crouse-Hinds distributor . . . or call the nearest Office listed below**

*Registered

A NATIONWIDE **DISTRIBUTION** exclusively through **ELECTRICAL DISTRIBUTORS**

CROUSE-HINDS COMPANY

Main Office and Factory: Syracuse, N. Y.

Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New Orleans, New York, Philadelphia, Pittsburgh, Portland, St. Louis, Salt Lake City, St. Paul, San Francisco, Seattle, Tulsa, Washington, Wilkes-Barre, Albany, Atlanta, Baltimore, Charlotte, Chattanooga

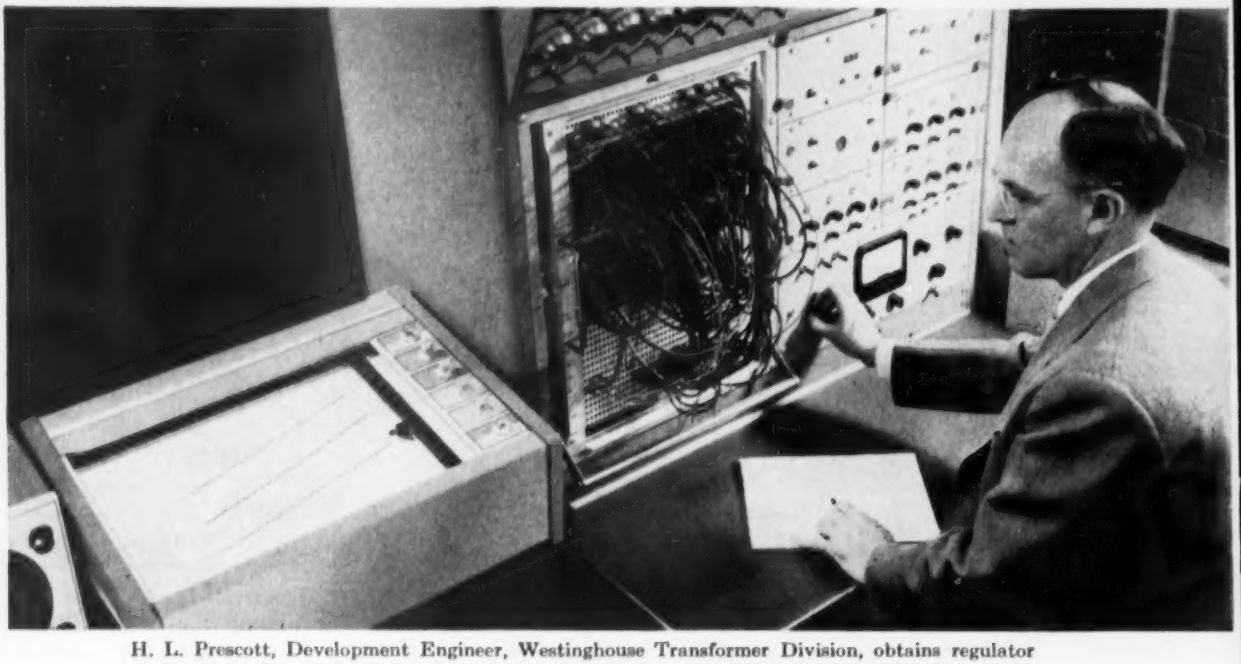
PROVED: WESTINGHOUSE *URL* AND *URF* REGULATORS

Limit voltage error to 1/3 that

PROBLEM: Determine the combination of regulator components that will provide best regulation with greatest reliability, least maintenance

APPROACH: Analog computer to simulate operation of various controls and tap changers, and to evaluate the performance under conditions found on utility systems

ANSWER: Combination of 1¼% steps, inverse time delay, instant-response tap changer



H. L. Prescott, Development Engineer, Westinghouse Transformer Division, obtains regulator performance data with the analog computer. Conditions of an actual distribution system are reproduced—voltages of various characteristics are generated and applied to simulated regulators.

Extensive studies at Westinghouse with the analog computer have proved this fact of outstanding importance to every electric utility . . . the Westinghouse system of 1¼% step voltage regulation holds set voltage with ½-⅓ the voltage error of any other regulator! Tests compared two major systems (table, right) of step regulator operation, with a ± 1-volt setting, under the three basic supply voltage conditions—smooth changes, large and rapid changes, irregular changes. Results proved that the ability of a regulator to hold a set value is dependent on the kind of voltage sensing device, time delay control and tap changer. Results proved—and without exception—that Westinghouse 1¼% step regulation holds narrowest effective bandwidths, regardless of individual system characteristics.

To the utility, Westinghouse regulation means greater revenue for these reasons:

1. From feeder to customer—fewer operations, fewer regulators, minimum total regulation equipment expense.
2. Satisfactory voltages can be furnished farther out on the line without reregulation.
3. Heavier loading of existing lines is practical.

COMPARE:

A—Westinghouse regulators with 1¼% steps, inverse time delay, instant-response tap changer

B—Other regulators with ¼% steps, fixed time delay, 7-second tap changer operation

Regulator	Set Time Delay	Maximum Voltage Error	Voltage Error Average
A	minimum	1.15	.20
B	15 second	1.22	.62
A	average	1.21	.25
B	30 second	1.28	.65
A	maximum	1.23	.29
B	60 second	1.34	.63

# of other regulators

G. K. Anderson, Voltage Regulator Sales, points to URL regulator whose superiority has been proved in service through thousands of installations for over ten years.

WESTINGHOUSE URL AND URF DISTRIBUTION VOLTAGE REGULATORS MEAN 42% FEWER OPERATIONS, 15% LESS CONTACT EROSION, FAR LESS MAINTENANCE

Providing these and many other advantages, the following features give you, altogether, the most practical regulators you can buy.

- Instant-response tap changer operates 15 times faster than other tap changers.
- Direct-drive Geneva gear mechanism provides optimum contact speed—eliminates flashover, minimizes contact burning, reduces erosion and carbonization.
- Load range selector—allows higher currents at reduced range operation; you get increased capacity to 160% of rated current at ± 5% regulation up to 400 amps.
- Coastal finish and single-bolt tank construction with no external hardware—maximum protection against corrosion.
- Separate tap changer oil compartment keeps metal and carbon from tap changer out of core and coil—eliminates core and coil maintenance.
- Unique new CVR relay with integral, adjustable, inverse time delay in drawout Flexitest* case.
- Unit assembly of core, coil and tap changer.
- Draw stud bushings with single-bolt cover simplifies untanking (though rarely necessary).

*Trade-Mark

NEW URF STEP VOLTAGE REGULATOR, DEVELOPED AS A RESULT OF THESE EXTENSIVE STUDIES, HAS THESE ADDITIONAL FEATURES:

1. Higher current ratings—extends range of 1¼% step regulator.
2. Built for feeder application—reduces your initial investment for regulators up to 167 kva.
3. Provisions for hand operation.
4. Bridging-type contacts with magnetic yoke eliminate pitting under short circuit, provide maximum mechanical strength.

J-70619

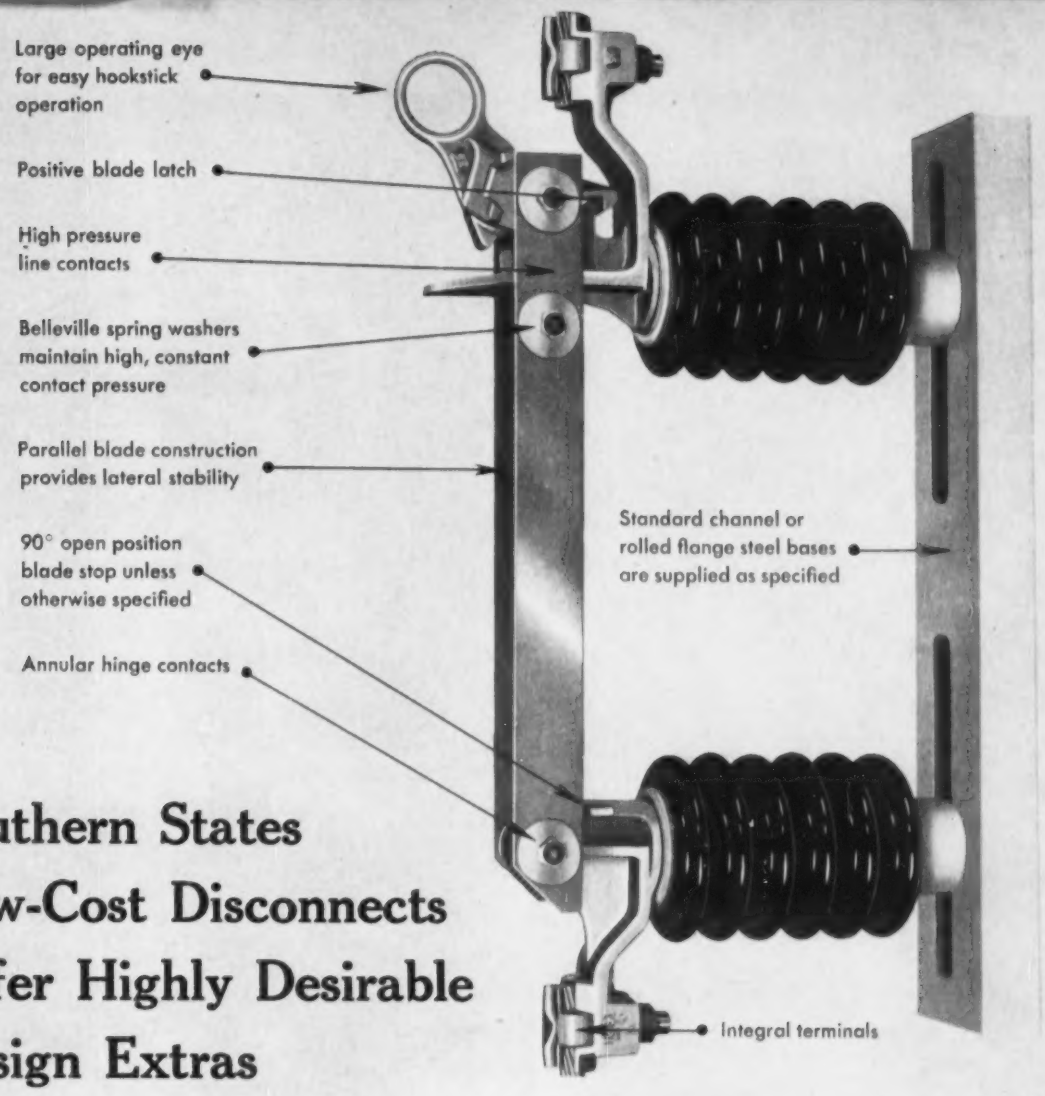
YOU CAN BE SURE... IF IT'S Westinghouse

Oil beats Sludge to the punch

DO MAINTENANCE CHECKS show equipment deterioration resulting from sludge build-up or acid formation? Then now is the time to switch to SHELL DIALA OIL AX—the insulating oil which *fights oxidation*, main cause of sludge and acid.

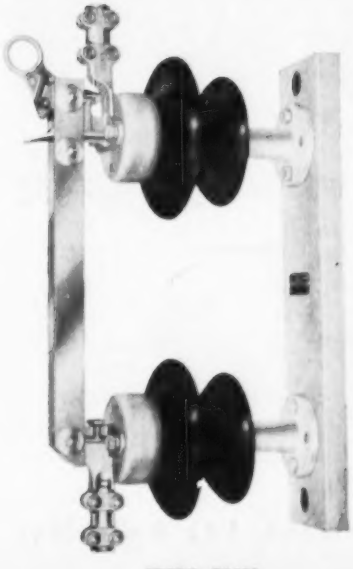
The secret of Diala's knockout power is a specially-developed oxidation-inhibitor, which is incorporated in an oil *specifically* refined for inhibiting. This combination is so effective, users report Shell Diala AX is still sludge-free *years after ordinary oils fail.* As a result, you get from three to five times the usual service life on your electrical equipment when you use this Shell insulating oil. *Plus* the advantage of eliminating the need for costly maintenance and frequent oil purification.

Chances are Shell Diala Oil AX—first of the inhibited oils—is the answer to your problem. It is one of many fine products developed by Shell Research, a 1500-man team strong on experience in your industry. Why not put that experience to work this week?


Large operating eye for easy hookstick operation
Positive blade latch
High pressure line contacts
Belleville spring washers maintain high, constant contact pressure
Parallel blade construction provides lateral stability
90° open position blade stop unless otherwise specified
Annular hinge contacts
Standard channel or rolled flange steel bases are supplied as specified
Integral terminals

Southern States Low-Cost Disconnects Offer Highly Desirable Design Extras

TYPE PH



TYPE PHM

As the illustration shows, the Type PH Disconnect has many features usually found on more expensive switches. With these highly desirable design extras available on a low-cost product, it is easy to justify its use on low-revenue distribution lines for isolating, by-passing, or disconnecting.

The Type PHM, shown in the smaller illustration, has all of the features of the Type PH. The only difference is that it has NEMA Standard insulators.

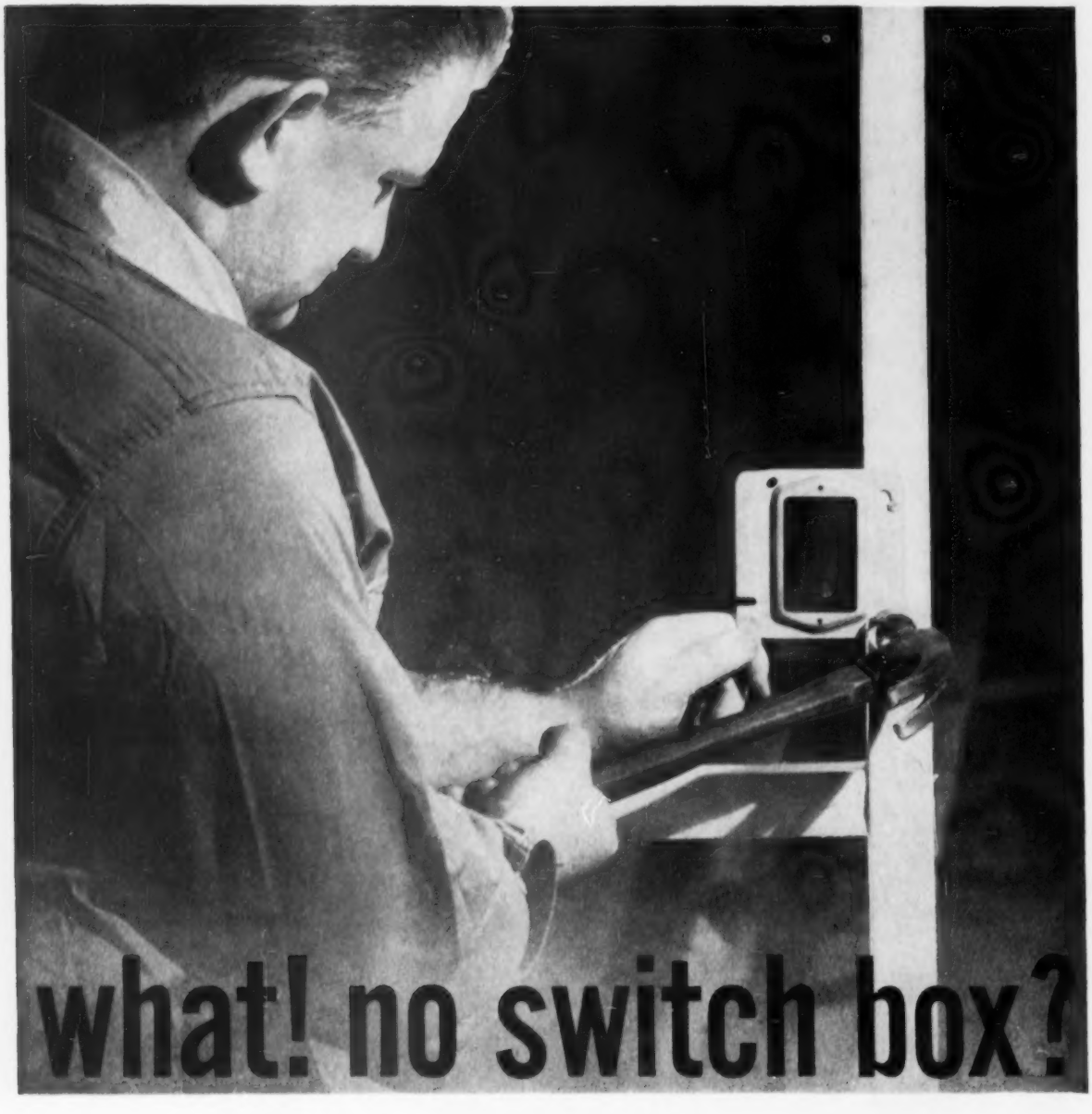
Both switches are single-throw, single-pole, hookstick operated. The PH may be mounted in vertical or underhung positions on wood crossarms. The PHM may be mounted on either steel or wood structures.

Full details will be furnished by your Southern States representative.

Both the PH and PHM are available in 7.5-15 kv, 200, 400, 600 amps. Also available are Southern States PHT and PHMT Tandem Transfer Switches in same ratings.

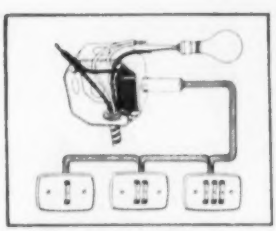
SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA: Dominion Cutout Co., Ltd., Toronto



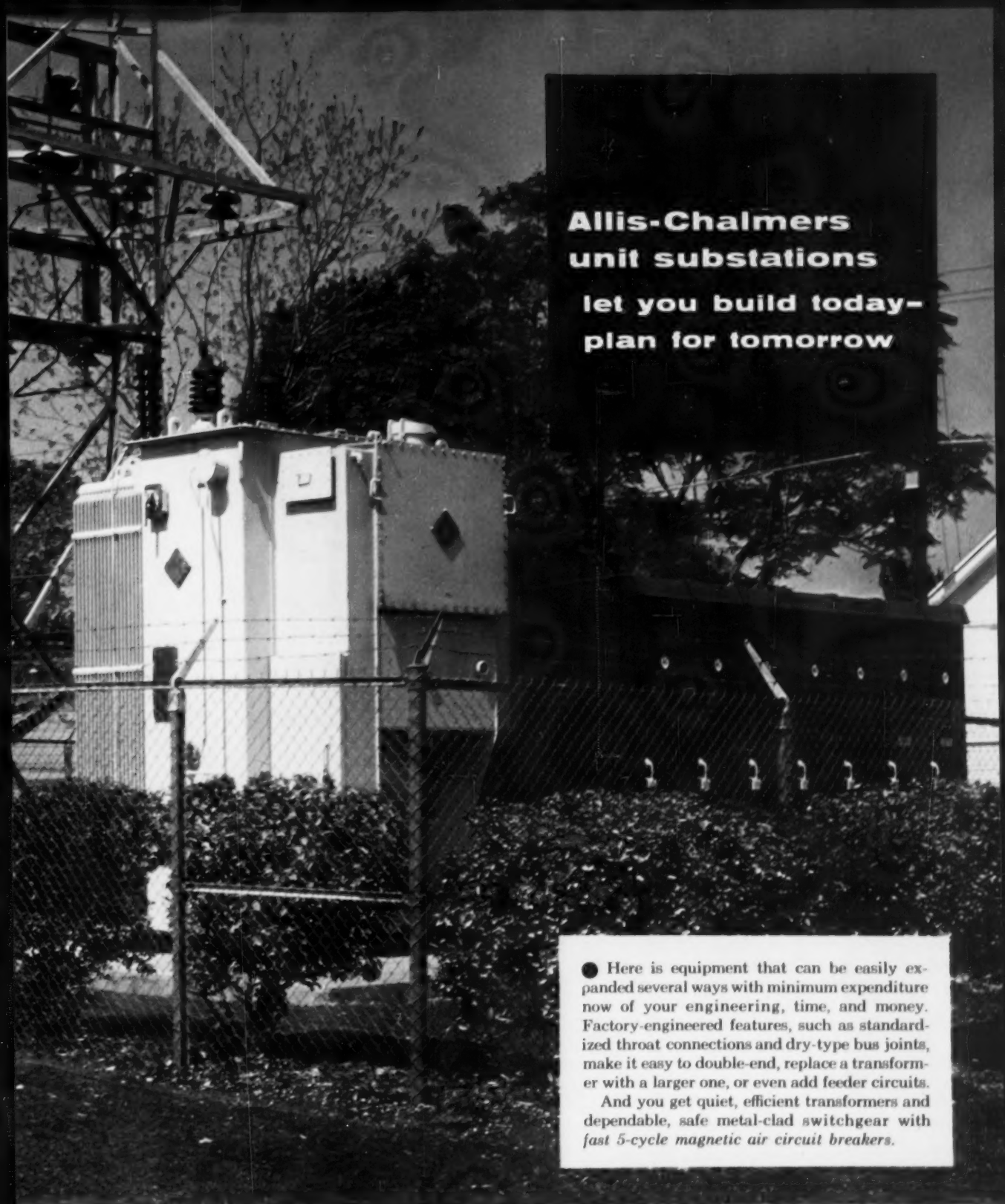
REMCON replaces the switch box with a time-saving plaster ring

Simply nail up a plaster ring and you're ready to hook up from one to five silent REMCON switches. Because REMCON operates on only 6 volts, you eliminate the need for a box at the switch location. With REMCON, you wire a switch in less than half the usual time. It's just one of the ways REMCON simplified low-voltage switching puts more money in your pocket. For every switching job...from 3-way switching to a complete basement-to-attic remote control installation...always reach for REMCON.



REMCON, a division of Pyramid Instrument Corp., Lynbrook, N.Y., manufacturer of the famous AMPROBE snap-around volt-ammeter.

WEST COAST REPRESENTATIVES: Allied Industries, Los Angeles; F. M. Nicholas, San Francisco; Northwestern Agency, Portland & Seattle



Allis-Chalmers unit substations let you build today– plan for tomorrow

● Here is equipment that can be easily expanded several ways with minimum expenditure now of your engineering, time, and money. Factory-engineered features, such as standardized throat connections and dry-type bus joints, make it easy to double-end, replace a transformer with a larger one, or even add feeder circuits.

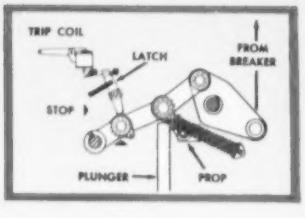
And you get quiet, efficient transformers and dependable, safe metal-clad switchgear with *fast 5-cycle magnetic air circuit breakers.*

A-5246

For help on your substation problems, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *for progress in switchgear*

Mechanically trip-free operation of this Pneu-Draulic operated breaker means positive protection



Since 1933—

Allis-Chalmers has built all power breakers mechanically trip-free. Only in mechanically trip-free breakers are contacts and closing mechanism completely uncoupled during tripping operation . . . enabling contacts to open at full rated speed without restriction from mechanism.

Breakers that are only pneumatically or hydraulically trip-free can't give you this protection.

Pneu-Draulic is an Allis-Chalmers trademark.

For details of this and other features of Allis-Chalmers power oil circuit breakers, call your nearby A-C office, or write to Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

A-5241

ALLIS-CHALMERS

Smooth-Bending Republic ELECTRUNITE E.M.T.

Western Electric's new distribution center in Solon, Ohio, called for thousands of feet of lightweight raceway. Hatfield Electric Company, contractors on the job, specified Republic ELECTRUNITE E.M.T. because of results it had given them in the past—easy, economical installation, great dependability.

The high ductility of ELECTRUNITE E.M.T. leaves surfaces smooth and unwrinkled after bending. Compression-type couplings and connectors mean no threads to cut, no runs to turn. The light weight of ELECTRUNITE E.M.T. makes for ease of handling. Exclusive "Inch-Marks" and "Guide-Lines" make any installation easier. For these reasons, costly delays are eliminated . . . work goes ahead on schedule.

ELECTRUNITE's tightly adhering galvanized coating protects against corrosion. It won't chip or flake off during bending. And because threading is not required, this coating remains unbroken. Hundreds of millions of feet of this quality conduit have been installed in concrete. Installations made more than 25 years ago continue to report trouble-free service.

Ease of installation and proved dependability are BIG reasons for checking the many advantages of Republic ELECTRUNITE E.M.T. It's produced to ASA Specifications C-80.3, Federal Specifications WW-T-806 latest revision, and carries the Underwriters' Seal of Inspection. Send coupon today for additional information.

COMPRESSION-TYPE COUPLINGS AND CONNECTORS mean no threads to cut, no runs to turn. This is a real advantage, particularly where space is limited. In addition, ELECTRUNITE E.M.T. offers many exclusive features. "Guide-Lines" keep bends in the same plane. "Inch-Marks" divide every length of Republic ELECTRUNITE E.M.T. into feet and inches—make quick measurement a cinch. "Inside knurling" reduces friction—makes wire-pulling as much as 30% easier.

Western Electric Co., Cleveland Distribution Center, Solon, Ohio
General Contractor—Albert M. Higley Co., Cleveland, Ohio
Architect—Lockwood-Greene Engineers, New York, N. Y.
Electrical Contractor—Hatfield Electric Co., Cleveland, Ohio

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION
DEPT. C-3840-A
216 EAST 131st STREET, CLEVELAND 8, OHIO

Gentlemen:
Please send me additional information on Republic ELECTRUNITE® E.M.T.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

An 8-tier run of Soapstone OCT-O-DUCT provides a new telephone link down hard-rock Nob Hill to colorful Chinatown in San Francisco.

YOU CAN ACTUALLY SEE SOAPSTONE DUCT SAVE YOU MONEY

1 Trenchside delivery of Soapstone OCT-O-DUCT eliminates field inventory problems and makes certain your duct is at your job when you need it.

3 OCT-O-DUCT's exclusive, flat-sided design eliminates the need for expensive interlayer spacers. Duct will not roll.

2 OCT-O-DUCT's convenient 4-foot lengths can be quickly installed by 2-men crews even in narrow and deep trenches.

4 OCT-O-DUCT is connected in the trench with easy-to-apply circular couplings making possible fast, rhythmic, production-line installation.

The many time- and work-saving features of Soapstone OCT-O-DUCT and full information on the sizes, bends and accessories available from this 30-year-old Company are contained in our Catalog and Installation Manual. For your FREE copies, drop us a note on your letterhead.

SOAPSTONE DUCT COMPANY
3985 Beach Street, Oakland 8, California

Distributed in the West by
MAYDWELL & HARTZELL, INC.
SAN FRANCISCO, LOS ANGELES, SAN DIEGO,
PHOENIX, PORTLAND, SEATTLE, SPOKANE

Patent Applied For

We just might . . . if you happened to be in our sound test chamber. It has a lower ambient sound level than most radio broadcasting studios. If a transformer burps in here, saying "excuse me" won't help.

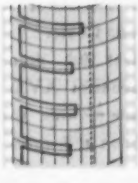


Chart Recorder records the measured sound level in decibels on each transformer. Units exceeding a pre-determined level (dotted line) are automatically rejected as substandard. A record is kept of the actual sound level in decibels for each unit.

Moloney has set permissible sound levels, for HyperCore Transformers, which are rigidly adhered to while transformers are under full excitation. Regardless of how well any of the other tests required have turned out, failure here automatically results in rejection.

Therefore, all HyperCore Transformers which are shipped from the factory will serve you well . . . and *quietly!*

MEBT-4

MOLONEY ELECTRIC COMPANY

Power Transformers • Distribution Transformers • Load Tap Changing Transformers • Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers • Network Transformers • Series Street Lighting Transformers • Subway Transformers Industrial Dry Type Transformers • Transformers and Inductors for Electronics

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Do you worry about plant expansion wiring costs

WHILE YOU'RE WAITING FOR A TRAIN?

If you're worrying about the costs of a new power distribution system — either in your present building or in that new plant you're planning — here's one way you can cut down on the worrying. Just specify Rockbestos A.V.C. (asbestos, varnished cambric insulated*) Interlocked Armored Cable. It will not only assure you of dependable service but will help you cut costs several ways. Here's how:

- Rockbestos A.V.C. Interlocked Armored Cable eliminates the need for costly conduits or ducts — it's easily installed on racks or hangers.
- Less layout time — less installation time mean important dollar savings.
- It permits planning for future installations — again at minimum cost.

Add to these direct cost-cutting advantages the long range economy of using a cable that gives you high current carrying capacity, that keeps maintenance at an absolute minimum and you can see the big savings possible when you specify and use Rockbestos A.V.C. Interlocked Armored Cable.

Get full details on dollar saving Rockbestos A.V.C. Interlocked Armored Cable — write now for complete specification and application data.

*Single conductors are N.E.C. type AVA

ROCKBESTOS PRODUCTS CORPORATION

NEW HAVEN 4, CONNECTICUT | NEW YORK, CLEVELAND, CHICAGO, PITTSBURGH, LOS ANGELES, DETROIT, ST. LOUIS, ATLANTA, DALLAS, OAKLAND, SEATTLE

ROCKBESTOS

A. V. C. Interlocked Armored Cable

For New Buildings, Expanding Existing Circuits, Relocating Old Circuits

NOW: From General Electric's
Regulator Engineers:
A Chart Designed To Help You . . .

COMPARE REGULATORS

Single-phase Step Voltage REGULATOR FEATURE	G-E	A	B	C	MEANING OF FEATURE
Electrostatic Shielding	YES	NO	NO	NO	Helps prevent build-up of arc-causing carbon deposits at critical points.
Controlled Switch Speed	YES	NO	YES	YES	Gives longer contact life. Means less maintenance.
32 ⅛% Step Regulation	YES	YES	YES	NO	Provides closest voltage control. Less contact wear.
Locking Screws On All Control Knobs	YES	NO	NO	NO	Makes sure that settings stay set.
Panel-mounted Reverse-Reactance Switch	YES	YES	NO	YES	Simplifies parallel or delta-connected applications.
Plug Connections On All Major Control Components	YES	NO	NO	NO	Allows easier, quicker maintenance of control.
Complete Range of Ratings	YES	YES	NO	YES	Facilitates your system planning.
One-piece Cover Bands	YES	NO	NO	NO	Simplifies maintenance. Pleasing appearance.
Aluminum/Copper Terminals	YES	NO	NO	NO	Offers flexibility; either type of conductor can be connected.
Lightning Arrester For Control Circuit	YES	YES	YES	NO	Provides additional protection to vital regulator controls.
Internal Thyrite* By-Pass Resistor	YES	NO	NO	NO	Affords maximum protection with no chance of external damage.
Steel Control Panel	YES	NO	YES	NO	Provides rigidity. Panel will not warp or break.

FOR MORE INFORMATION on the benefits your system can get with General Electric feeder voltage regulators, contact your G-E Sales Representative or write Section 423-19, General Electric Co., Schenectady 5, N. Y.

*Registered Trademark of General Electric Company for Resistance Material.

Progress Is Our Most Important Product

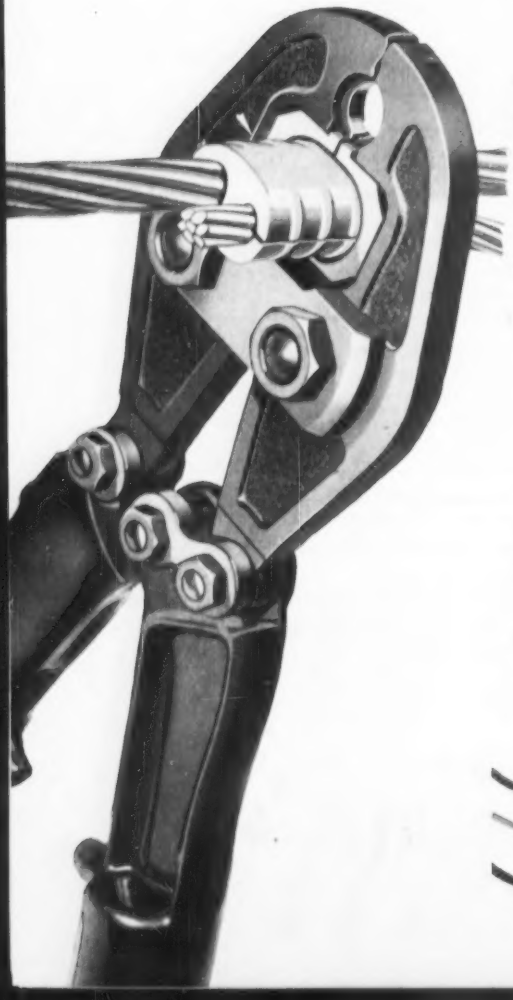
GENERAL ELECTRIC

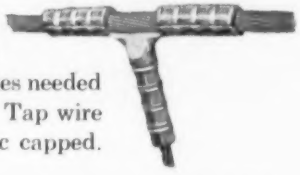
new...KEARNEY SQUEEZONS ...sealed in individual

Here is the positive answer to a problem confronting every power company: how to make sure inhibitor is properly applied every time a tap is made. Now the inhibitor can't be forgotten or skipped — because Kearnalex is *pre-applied inside the Squeezon jaws.* The lineman simply rips open the plastic bag . . . inserts cleaned conductor into Squeezon jaws. Since Kearnalex compound is already in the groove, positive application of inhibitor is simultaneous with compression.

Squeezons are also available as formerly, for application of inhibitor on the job. But if you want to save even more time and labor, order Squeezons pre-packaged in plastic with Kearnalex already applied. That way, you'll be certain the job's done right . . . and that connections on your lines are made for keeps.

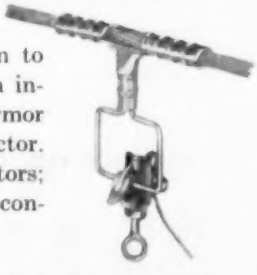
better connections . . . less time and labor with KEARNEY Compression Fittings



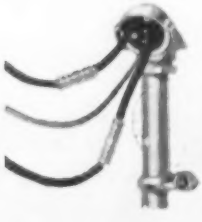


T-TAPS Heavy-walled, with extended contact areas—make stable connections under all load conditions. Only two die sizes needed to install complete size range of T-Taps. Tap wire sockets filled with Kearnalex and plastic capped.

L-TAPS For safely connecting copper to aluminum (line side or tap side) where atmospheric conditions would physically bridge spacers of Squeezons. Conductors widely separated by heavy aluminum section to prevent galvanic action between dissimilar conductors. Socket for tap wire filled with Kearnalex, and plastic capped.

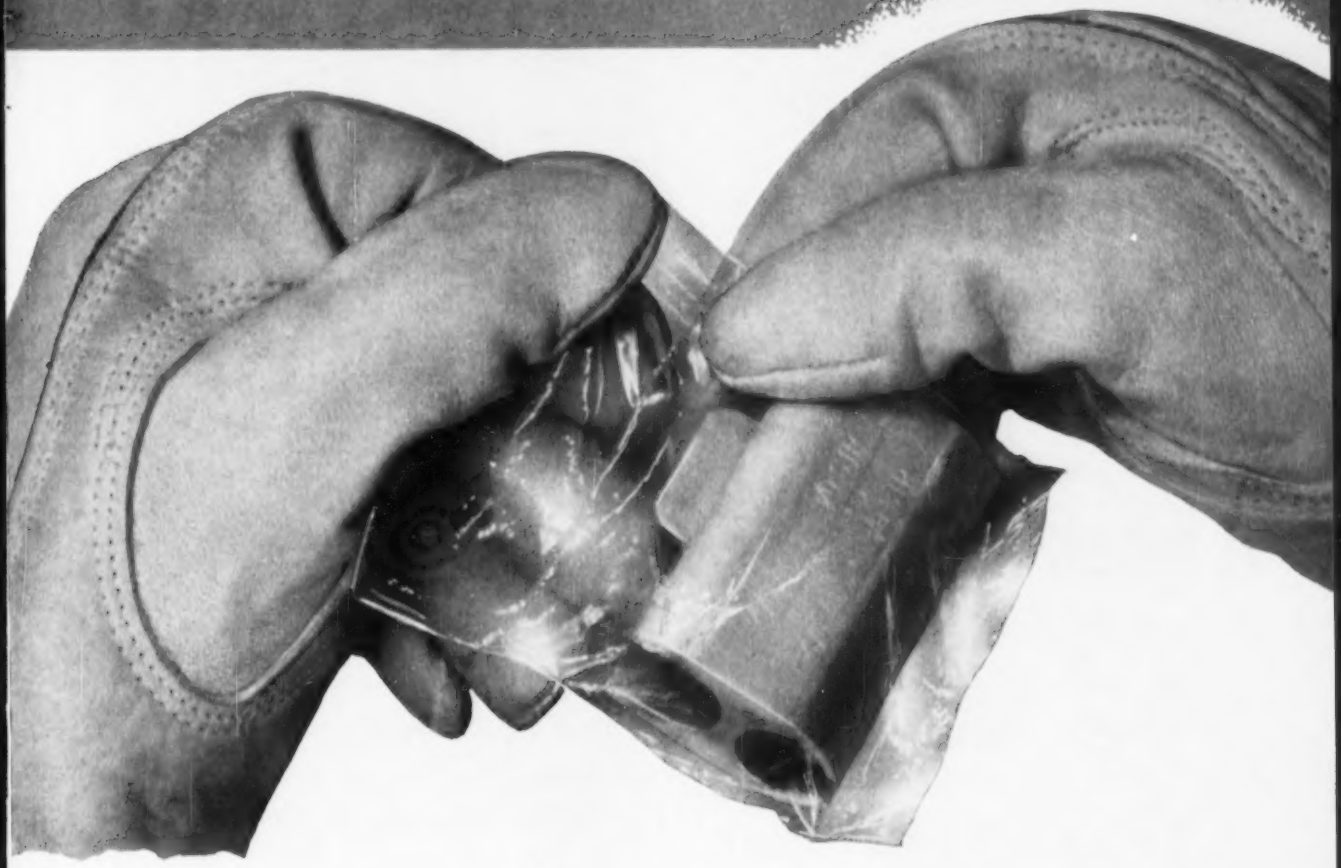


T-TAP STIRRUPS Provide complete protection to aluminum conductors from arc damage when installing or removing hot line clamps. No armor rods needed—T-Taps will not twist on conductor. T-Taps can be compressed on live conductors; help reduce costs, especially for larger line conductors since smaller clamps can be used.



SERV-ENS Outstanding compression connector for splicing all combinations of ACSR, aluminum and copper for service entrances. Sockets filled with Kearnalex. As conductor enters socket, Kearnalex is forced over entire area of inserted wire. Solid metal barrier prevents over-insertion of conductors.

with inhibitor already applied plastic bags



GROUND ROD FITTINGS These Squeezon fittings improve circuit safety by eliminating open grounds and ground wire burn-offs caused by loose clamps. No screws or bolts to loosen, essentially tamper and theft-proof. Pure copper, safe for buried installations; low in cost and quickly installed.

GROUNDING LUGS Squeezon grounding lugs are used extensively for corrosion-free grounding of galvanized hardware, switch bases and similar equipment on transmission structures. Solid aluminum lugs compatible with galvanizing . . . either aluminum or copper wires may be used. Sockets filled with Kearnalex and plastic capped.

JAMES R. KEARNEY CORPORATION *General Offices:* **4224-42 Clayton Ave., St. Louis 10, Mo.**

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor, **Maydwell and Hartzell, Inc.,**
Los Angeles • Seattle • Portland • San Francisco • Spokane • Phoenix.

for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify

JAMES R. KEARNEY CORPORATION ST. LOUIS MO. GUELPH, ONT.

The Mark of Quality

KEARNEY PRODUCTS

Plants at: ST. LOUIS • FAYETTEVILLE, ARKANSAS • SHENANDOAH & CLARINDA, IOWA — GUELPH, ONTARIO, CANADA

A month ago we ran this ad

"This kit
helped me
sell three lighting
jobs worth $1,300 . . . all the same day"
Now General Electric "Plan-It-Yourself" Lighting Layout Kit can help you sell More Lighting Jobs, Too!
Progress Is Our Most Important Product
GENERAL ELECTRIC

A week ago Harry wrote:

"It's too bad you ran that ad so soon. I have since completed an installation of 23 four-lamp, 8-foot fixtures, and then submitted a layout of 44 fixtures for a supermarket addition. I not only sold the 44, but an extra 56 as well to replace the old store lighting! That's $6,500 worth of lighting business!

"Now I'm going to have to re-read the ad and buy another kit. I'm out of 8-foot stickers!"

Latest picture of Harry!

(And who wouldn't smile? According to Harry, "that $6,500 means a profit increase of about 500%!")

This new General Electric "Plan-It-Yourself" Lighting Layout Kit can help you sell more lighting jobs, too—so get yours today from your local G-E Lamp Supplier. Or send $1.75 to: General Electric Co., Large Lamp Dept. WE-77, Nela Park, Cleveland 12, Ohio. There are still a few kits left!

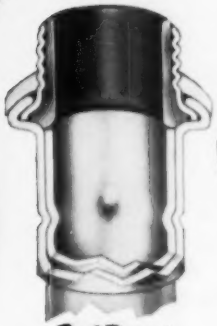
Progress Is Our Most Important Product

GENERAL ELECTRIC

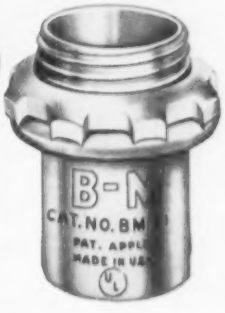
B-M

the original concrete-tight **INDENTER FITTINGS** *for E.M.T.*

Red Throat
Insulated Connector



Red Throat
Cross section



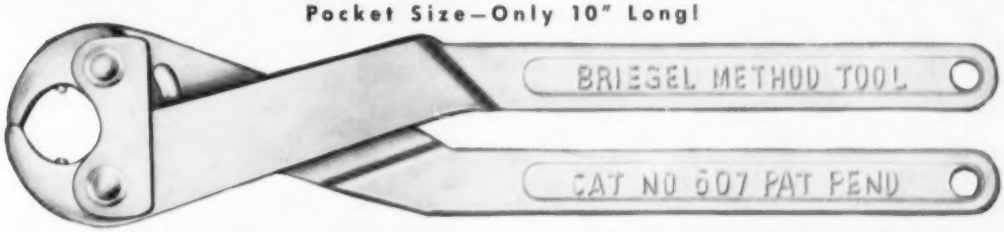
"BM" #100
Cutter for ½, ¾ and 1" E.M.T.

"BM" #1000
Holder for ½, ¾ and 1" E.M.T.

"BM" #600
Changeable Jaw Indenter

THE NEW BM607 INDENTER FOR ½" FITTINGS

Pocket Size—Only 10" Long!



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UL

TELESCOPE BM SYSTEM

All B-M Indenter Fittings are U.L. Approved as concrete-tight and all Compression Fittings as rain-tight as well as for general use (File Card E10863). Also comply With Federal Specifications W-F-406.

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

SOLD ONLY THROUGH ELECTRICAL WHOLESALERS

NEWEST REASON WHY ALL TRANSFORMERS ARE NOT ALIKE

New service-continuity watchdog

New breaker, new operating-handle sequence,
and valve-type arresters
assure maximum service continuity
with General Electric
self-protected distribution transformers

With the use of self-protected transformers steadily increasing, General Electric has developed a new breaker and a new reset handle to help utilities maintain the best possible service, especially in overload areas. The breaker provides simultaneous opening of all contacts, and the new reset handle virtually eliminates unintentional opening of the breaker by linemen.

Designated "T-2", the new breaker is used on all self-protected G-E transformers rated 37½ kva and above, together with G.E.'s dependable, long-life Magne-valve arresters

and internal fuses. Twenty per cent shorter than other types of breakers for similar application, the new breaker helps keep tank heights down.

Reduces chance of feedback burnouts

One driveshaft, common to all contacts, operates all breaker poles simultaneously. It is impossible, therefore, for the contacts to open on one line only. This eliminates the possibility of damage to motors due to undervoltage through a single closed contact and connected load.

Helps eliminate unintentional opening

Following the unique operating sequence, the lineman merely moves the handle *down* against the stop in the "closed" position to reset the signal light. So there is no possibility of accidentally tripping the breaker. It is also possible for the lineman to test the overload lamp without removing it—another unique feature.

Emergency device provides for 15% overloads

Uprated at the factory to carry an additional 20% of load before tripping out, the new breaker also includes an emergency overload device. In a few seconds the lineman can raise the trip temperature, permitting the transformer to carry an additional 15% of load before the breaker trips. This makes it possible to maintain service to the customer until the power company can replace the transformer with a higher-rated unit.

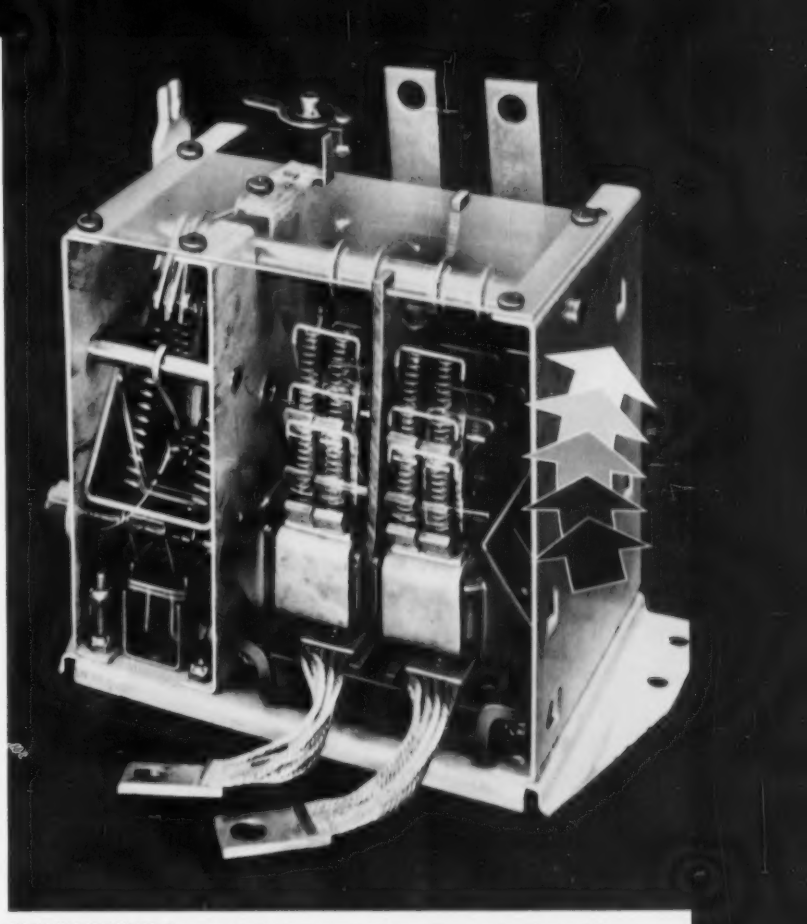
All transformers are not alike

The new circuit-breaker and new reset handle sequence are just two of the main advantages of General Electric distribution transformers. Others include *Formex* wire* to increase reliability and cut tank size, *Nitrile rubber gaskets* to give superior sealing, *Strenicor clamps* to prevent terminal breakage, and many others—evidence that all transformers are not alike.

For complete information contact your nearest G-E Apparatus Sales Office or G-E Agent—or write to Section 431-49 General Electric Company, Schenectady 5, New York.

LIVE BETTER ELECTRICALLY

*Reg. Trademark of General Electric Co.

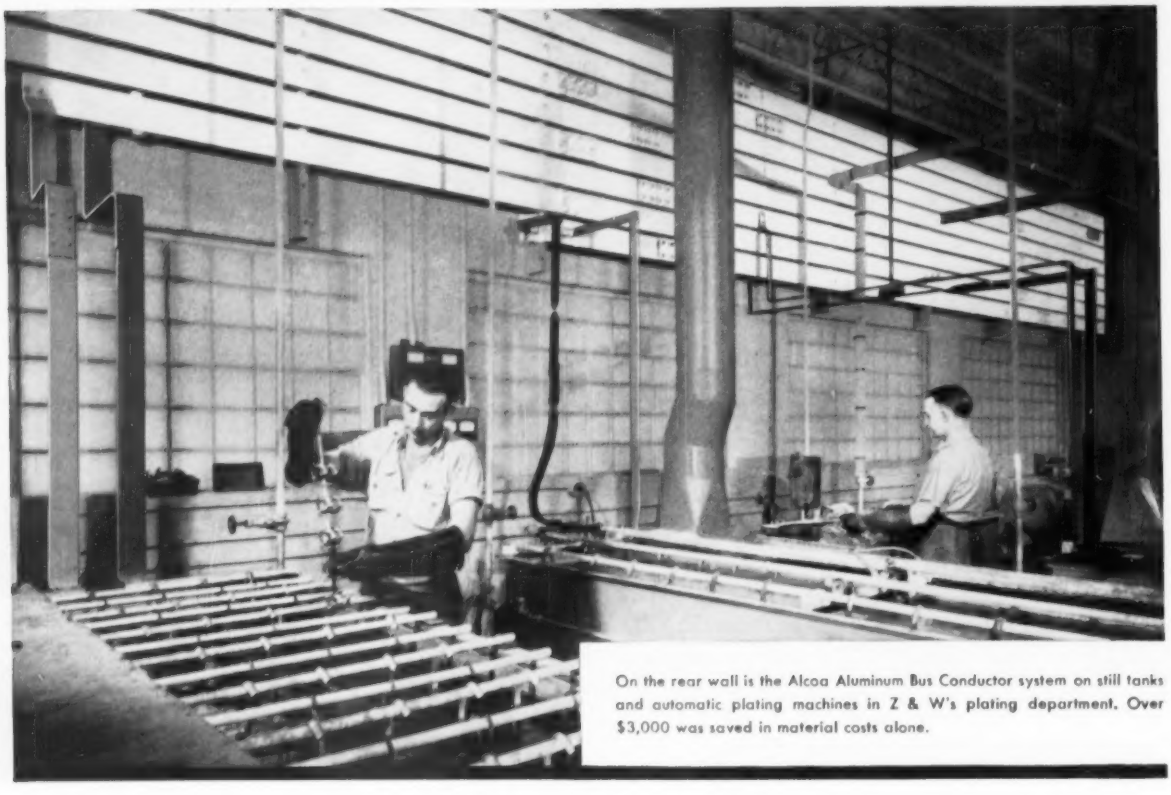


IT IS IMPOSSIBLE for contacts to open on one line only. For with the G-E design, one driveshaft operates all poles simultaneously.

NO ACCIDENTAL TRIPPING is possible with G.E.'s unique new operating sequence for breaker reset handle. Lineman merely moves handle *down* against stop in "closed" direction to reset light.

Progress Is Our Most Important Product

GENERAL ELECTRIC



On the rear wall is the Alcoa Aluminum Bus Conductor system on still tanks and automatic plating machines in Z & W's plating department. Over $3,000 was saved in material costs alone.

$3,000 IN DIRECT SAVINGS

With Alcoa Aluminum Bus Conductor at Z & W Manufacturing

When Z & W Manufacturing Corporation designed their new 130,000 sq ft plant in Wickliffe, Ohio, they wanted equipment second to none—yet costs were closely watched. One of the best of the money-saving acts took place in their plating department.

After a detailed study, they used Alcoa® Aluminum Bus Conductor to carry the 12,000-amp load from individual rectifiers to the six plating lines. Compared to a copper system Z & W got the same conductivity from half as many pounds of metal. Only difference was a slight increase in size. In installing a system using high-conductivity aluminum alloy, Z & W estimates they saved more than $3,000 in direct material costs alone.

Easy fabrication and installation

Other important benefits and savings resulted from aluminum's light weight and easy handling. Also important was the ease of fabrication during their bending and drilling operations. The ½" x 6" bars were just bolted to 2 x 8's attached to the wall. Simple insulating washers and wood spacers were used.

Having some small copper bar stock on hand, they used that as leads in some places—other leads were aluminum. Trouble-free joints between copper and aluminum were made, as were all joints, with Alcoa Electrical Joint Compound and aluminum bolts.

Saves 50% on bus conductor

The same technical advice and assistance from Alcoa that enabled Z & W to engineer, design, fabricate and install this bus system are yours for the asking. Study how much you could save with Alcoa Bus Conductor—for expansion or modernization. Cost is about half. Just check the Yellow Pages of your phone book under "Aluminum" for Alcoa's nearest office. Or write, Aluminum Company of America, 2308-G Alcoa Building, Pittsburgh 19, Pa.

Your Guide to the Best in Aluminum Value

STANDARD ENGINEER'S FIELD REPORT

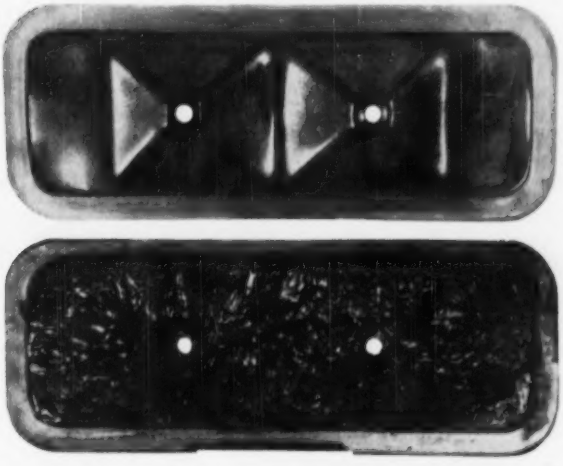
PRODUCT RPM SUPREME MOTOR OIL

FIRM VETERANS TAXICAB CO. San Francisco, California

Fleet cylinder wear only .0002″ per 10,000 miles using new RPM SUPREME Motor Oil

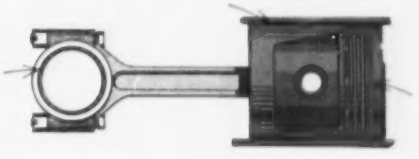
A B C D

Using RPM SUPREME Motor Oil for 33,000 stop-start miles of low-temperature driving, engines of Veterans taxicabs showed average cylinder wear rate of only .0002" per 10,000 miles! Note excellent condition of piston A from typical engine using RPM SUPREME—all rings free, no clogging of oil ring vents. Piston B, from engine using conventional multi-grade oil, collected heavy deposits on rings and skirt. Oil ring vents are 40% clogged. Compare cleanliness of oil screens from these engines: with RPM SUPREME screen C remained clean, with no clogging of mesh. Screen D from other engine is 85% clogged.



Outstanding Detergent-Action advantages of new RPM SUPREME Motor Oil is proved by side cover deposit comparison. Cover at top shows virtually no deposits in 33,000 miles using new RPM SUPREME. At same mileage, heavy sludge coats cover of engine using conventional multi-grade oil.

New RPM SUPREME Motor Oil halts engine wear



- Exclusive Non-Metallic Polymeric Detergent-Action Compound keeps engines so clean, guards them so well, they last years longer.
- Anti-oxidant resists deterioration of oil and formation of lacquer.
- Engines get SUPREME protection in all seasons, climates, conditions.

For More Information contact your Standard Engineer or Representative, or write 225 Bush Street, San Francisco 20, California.

SUPREME RPM MOTOR OIL

TRADEMARKS "RPM" AND "CHEVRON" DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA

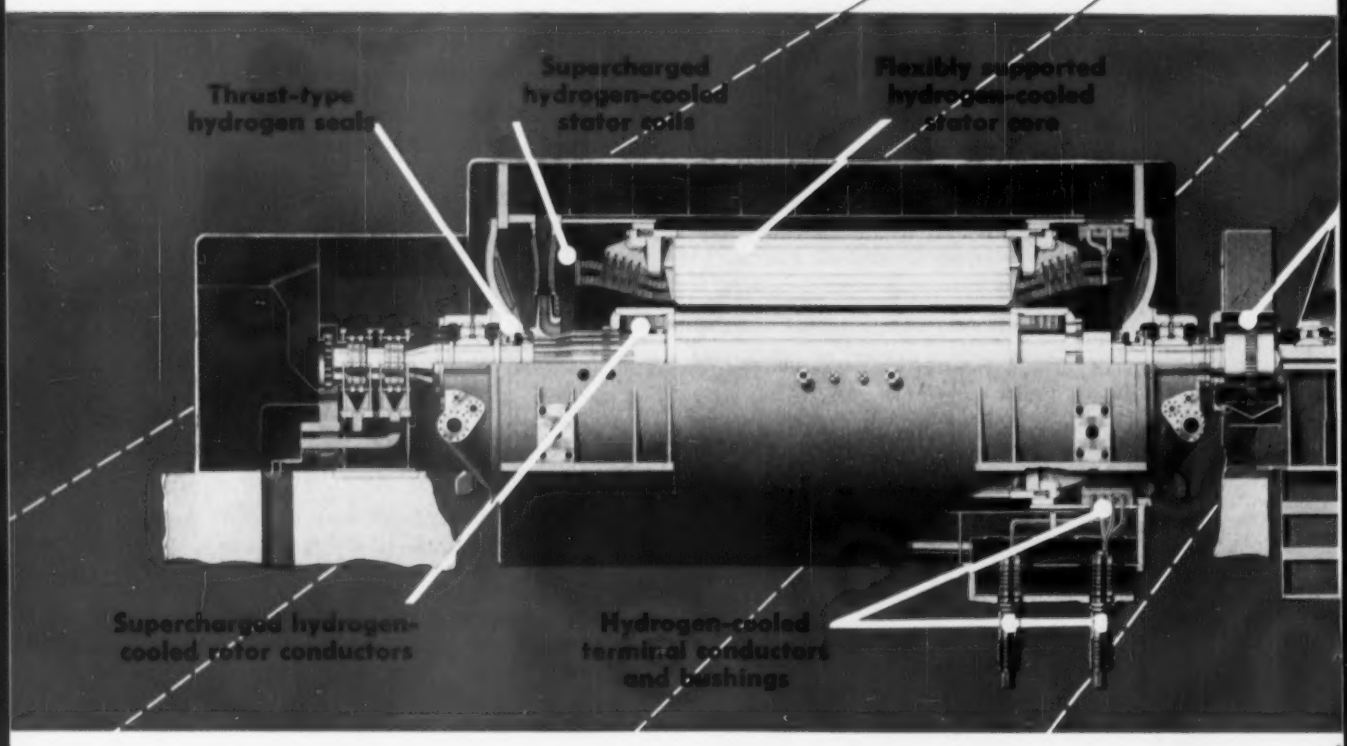
On the

. . . 150-mw double-flow reheat steam turbines with fully supercharged generators for Public Service Company of Indiana

THESE tandem-compound turbines with 26-inch exhaust blades embody such advanced design features as side crossunders that do not have to be removed during inspection; new underslung, side-mounted, two-speed turning gear; solidly bolted-down front control pedestal; and below-floor primary and reheat steam valves.

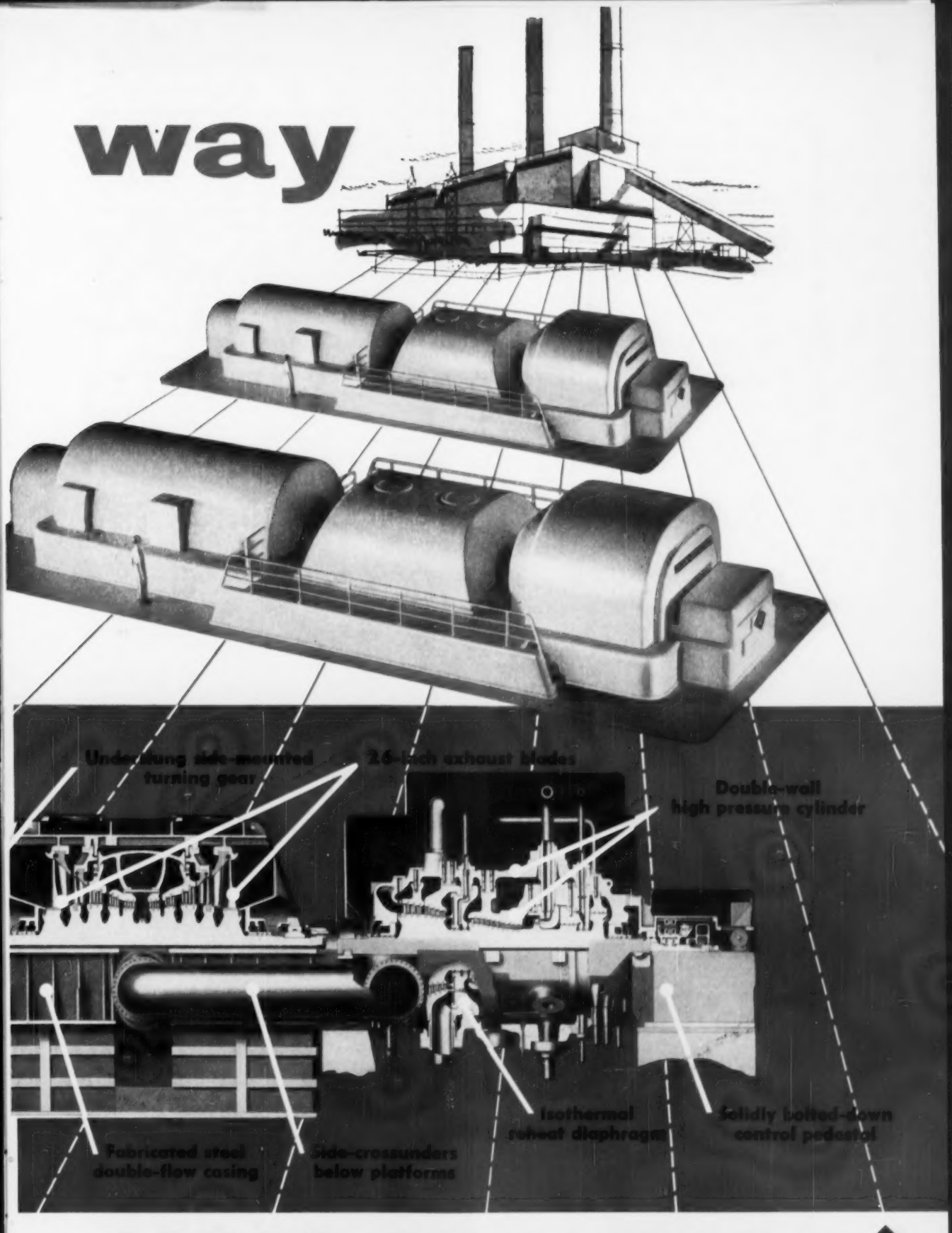
In the fully supercharged generators, high velocity hydrogen efficiently cools rotor copper, stator coils, core, terminal conductors, and bushings — applying fully the advantages of Allis-Chalmers pioneering in supercharged cooling.

Advances in design of double and triple-flow tandem ratings to 250 mw, and of 3600/3600 rpm and 3600/1800 rpm close-coupled cross-compound arrangements to 500 mw and larger, are discussed in publication 03R8620. Write your nearby A-C office or Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.


Thrust-type hydrogen seals
Supercharged hydrogen-cooled stator coils
Flexibly supported hydrogen-cooled stator core
Supercharged hydrogen-cooled rotor conductors
Hydrogen-cooled terminal conductors and bushings

Units for New Albany Station of Public Service Company of Indiana. Turbine steam conditions: 1800 psig, 1000/1000 F, 1.5 in. Hg abs exhaust. Generators: 176,470 kva, 0.85 pf, 18,000 volts, 0.64 SCR at 45 psig hydrogen pressure. Consulting engineers: Sargent and Lundy.

way



ALLIS-CHALMERS

A-5306

Ask your distributor for Youngstown Buckeye Full Weight Rigid Steel Conduit and Youngstown Electrical Metallic Tubing.

When the new addition and remodeling of Employers Mutual Casualty Company's existing office building in Des Moines, Iowa, was planned, Youngstown's "Buckeye" Full-Weight Rigid Steel Conduit was wisely specified to provide life-time positive, safe protection for the electrical wiring system.

If safe and efficient functioning of **your** electrical systems—in any location, under any condition—presents a problem, then Youngstown "Buckeye" Conduit should be specified. Satisfied users across the nation report to us: "It's much easier to bend and thread—wire fishing is less troublesome—and because its corrosion resistance is superior, we get a much longer service life."

"Buckeye" Conduit is fast becoming the specification of leading building owners, architects and contractors—why not make it yours?

Delivering is no problem—as all the better distributors in electrical and industrial markets carry complete and ample stocks. Their quick, courteous service is yours for a phone call, anytime.

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . provides permanent wiring protection for remodeled Iowa building

Employers Mutual Casualty Co. Bldg., Des Moines, Iowa
Architects & Engineers: Childs & Smith, Chicago, Ill.
General Contractor: Weitz Construction Co., Des Moines, Iowa
Electrical Contractor: Weston Lighting Co., Des Moines, Iowa

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

1612 years of fail-free service prove...

COMPLETE THREE-POLE PROTECTION IN ONE TANK

One answer to rising maintenance costs is the Westinghouse single-tank Type G breaker. More efficient use of oil, reduced maintenance hours and small space requirements add up to major maintenance savings. There are only two adjustments—mechanism stop and travel stop.

1612 breaker-years of service without failure assure this economy without compromise on protection.

The Westinghouse single-tank Type G breaker has a single De-ion® grid per phase—with exclusive Westinghouse design to shorten arc length and arcing time. Interrupting time is five cycles. Interrupting capacity is 100 or 250 mva at 14.4 kv—and 250 mva at 23 kv.

Complete details are available from your Westinghouse sales representative—or you may write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, requesting booklet B-5834. J-60927

YOU CAN BE SURE...IF IT'S

Westinghouse

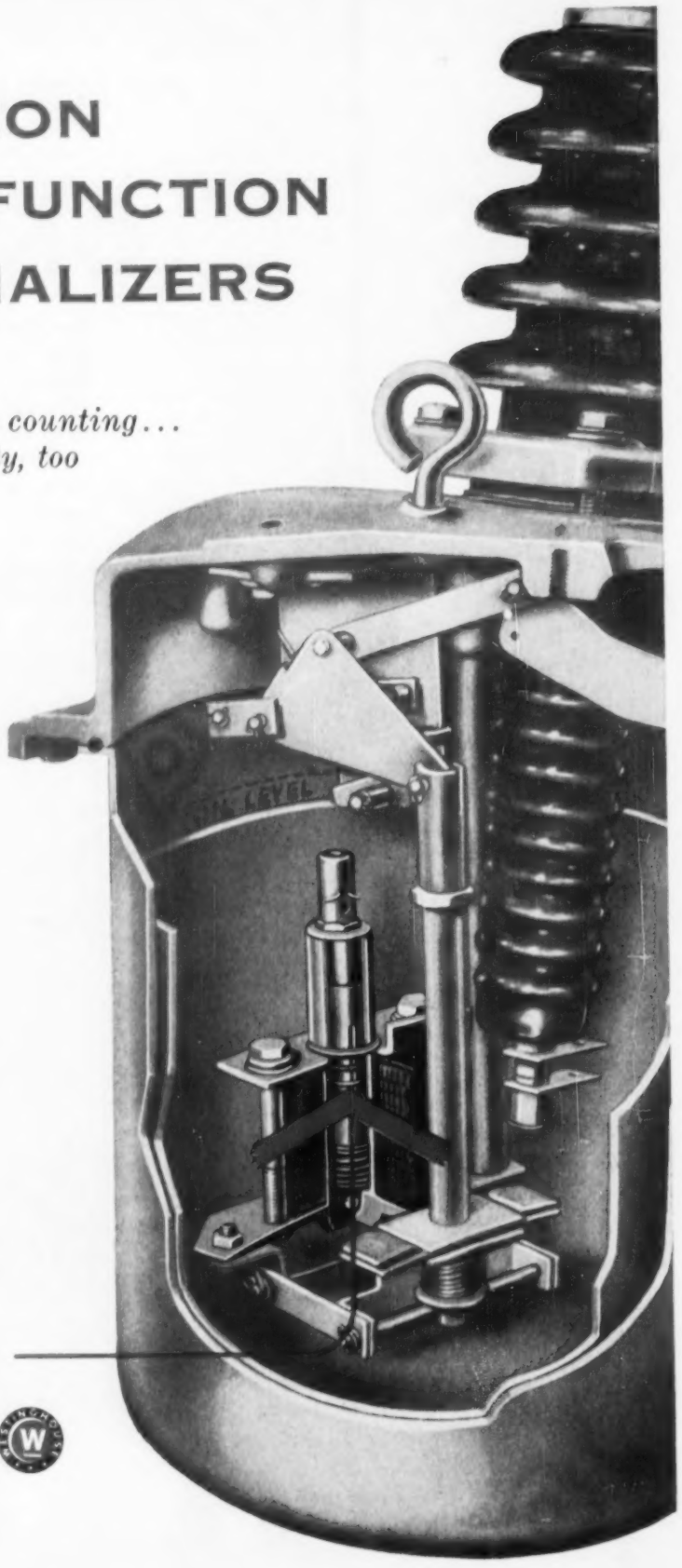
COORDINATION IS A PRIME FUNCTION OF SECTIONALIZERS

Only Westinghouse gives you absolutely precise counting... and greater current capacity, too

By definition, a sectionalizer is an automatic switch which works in conjunction with power circuit breakers and reclosers to isolate local, permanent faults and thereby protect system service continuity. Its ability to coordinate with breakers and reclosers is therefore a paramount factor in evaluation.

Westinghouse sectionalizer coordination is positive. The Westinghouse sectionalizer will carry more than 50% greater current, continuously, and will accept momentary loads up to 6500 amperes. The Westinghouse Type GRS line is the most complete—nine current steps from 5 through 140 amperes—and voltage ratings to 15 kv.

Complete details are available from your Westinghouse sales representative. Also, you may write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania, for reprint No. 5090, an application and engineering AIEE paper on sectionalizer coordination concepts. J-60923



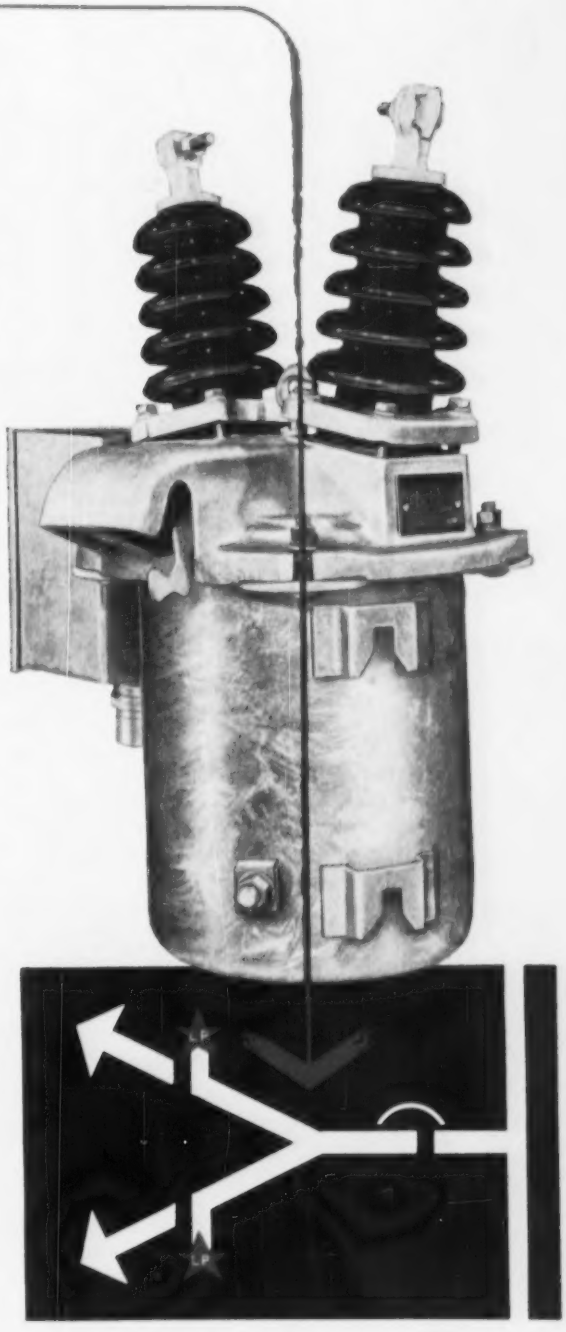
Consistent and accurate counting is assured by the patented magnetic rings in the integrator mechanism. During operation, the brass integrator piston is locked in each counting position by the magnet plate on top of the series coil.

YOU CAN BE SURE...IF IT'S

Westinghouse

A Westinghouse Exclusive

A FOUR HOUR LOAD PICKUP JOB DONE IN FIVE MINUTES



. . . by two new Westinghouse automatic load pickup switches.

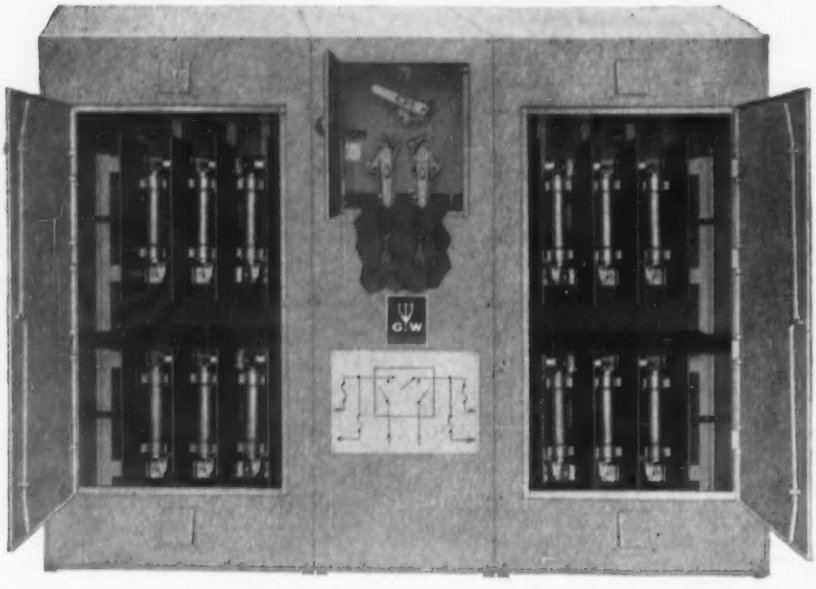
Manual restoration on the same circuit, by conventional sectionalizing methods, required four hours and much man power. The line covered 75 circuit miles of 6.9-kv service, with 1309-kva transformer capacity. Under automatic load pickup re-energization, *no protective equipment was subjected to overload for more than one-half cycle.*

The Westinghouse LP automatic load pickup switch is a 15-kv, 200-ampere unit for all voltage ratings from 2.3- to 15-kv. Thermal time-delay is available in increments of two seconds to five minutes. Complete details are available from your nearby Westinghouse sales representative—or by requesting Bulletin 38-860 from Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60909

For a complete engineering report on the application described, write the address at left, asking for reprint No. 5235.

YOU CAN BE SURE...IF IT'S

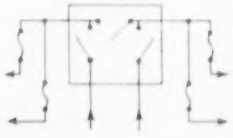
Westinghouse



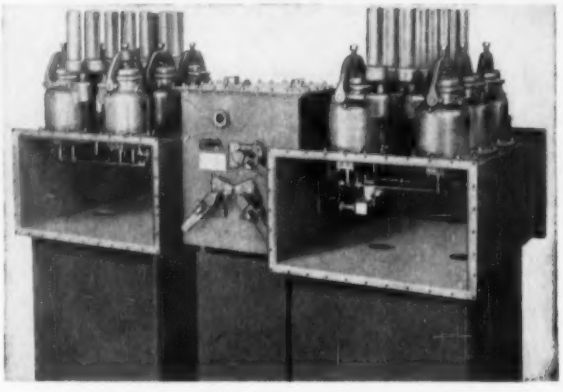
Type "SCRA" unit, 3 pole, 5000 volts, 400 ampere, 4-way oil switch with 4 sets of high interrupting capacity power fuses. Similar units are available in 15 Kv. and higher voltage ratings.

FLEXIBILITY for 2 Feeds & 4 Loads

— safely and economically provided by G & W load break oil switches combined with power fuses or with oil fuse cutouts.



The schematic diagram above applies to either combination unit illustrated. The Type "RA" load break oil switch has three sets of manually operated links. Normally, the upper set of links are open and two loads are supplied from each feeder separately. By opening either set of lower links and closing the upper links, all four loads can be supplied by either feeder.



Type "FCRA" unit, 3 pole, 5000 volts, 400 ampere, 4-way oil switch with 4 sets of "FC42" oil fuse cutouts, 5000 volts, 200 amperes, gang operated.

Get in touch with us or our nearest representative for information on combination Fuse-Switch units for your high voltage distribution centers.

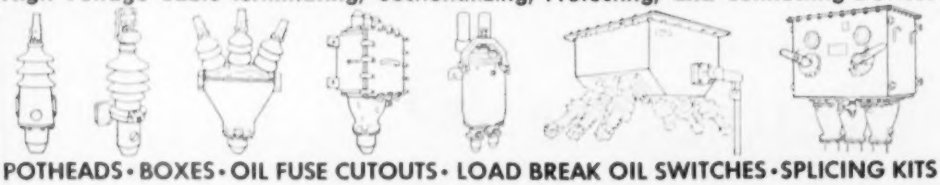
G & W ELECTRIC SPECIALTY COMPANY
3500 W. 127th ST., BLUE ISLAND, ILLINOIS

CD571

Representatives in many cities of U. S. A., N. & S. America — Canadian Mfr. — Powerlite Devices, Ltd., Toronto, Montreal & Vancouver

G&W

High Voltage Cable Terminating, Sectionalizing, Protecting, and Connecting Devices

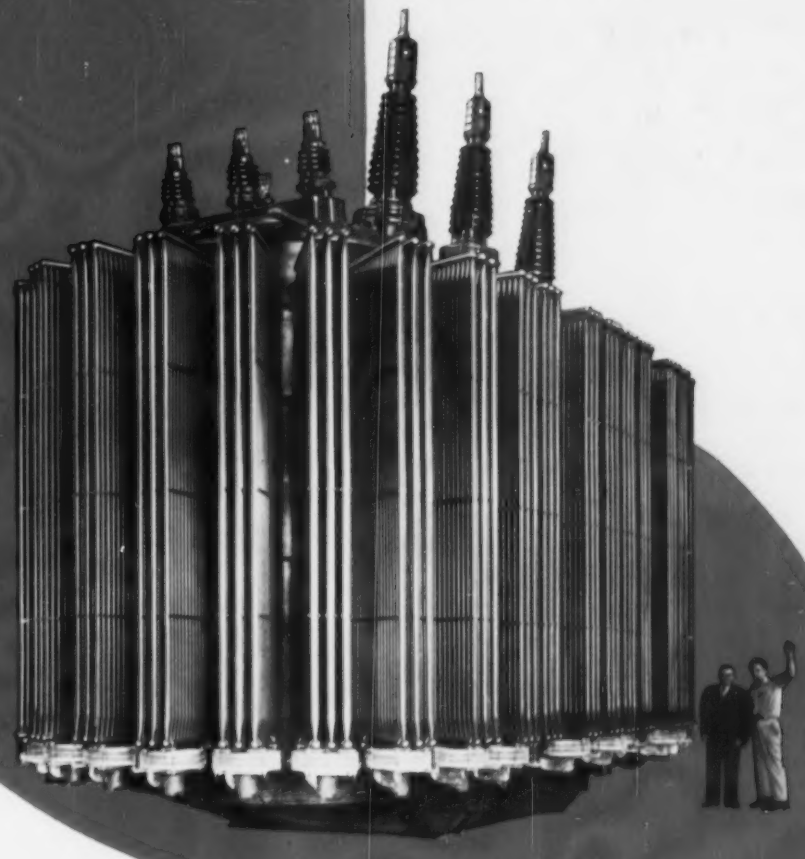


POTHEADS • BOXES • OIL FUSE CUTOUTS • LOAD BREAK OIL SWITCHES • SPLICING KITS

60,000 KVA

Three Phase

PENNSYLVANIA POWER TRANSFORMER



This three-winding auto transformer has a forced-air-cooled rating of 60,000 Kva and a self-cooled rating of 48,000 Kva. It is designed to take the full capacity of the generator on the 13,200 volt delta tertiary winding and step up the voltage to either 132,000 volts or 67,200 volts, or to both simultaneously. If the generator is out of service, the transformer permits full capacity transfer between the 132,000 volt and 67,200 volt systems through the auto connection in the high voltage winding.

PENNSYLVANIA
TRANSFORMER COMPANY
A McGRAW ELECTRIC COMPANY DIVISION
CANONSBURG, PENNSYLVANIA
Greater Pittsburgh District

SEE NEXT PAGE FOR INSIDE STORY

INSIDE A 60,000 KVA *Three Phase* PENNSYLVANIA POWER TRANSFORMER

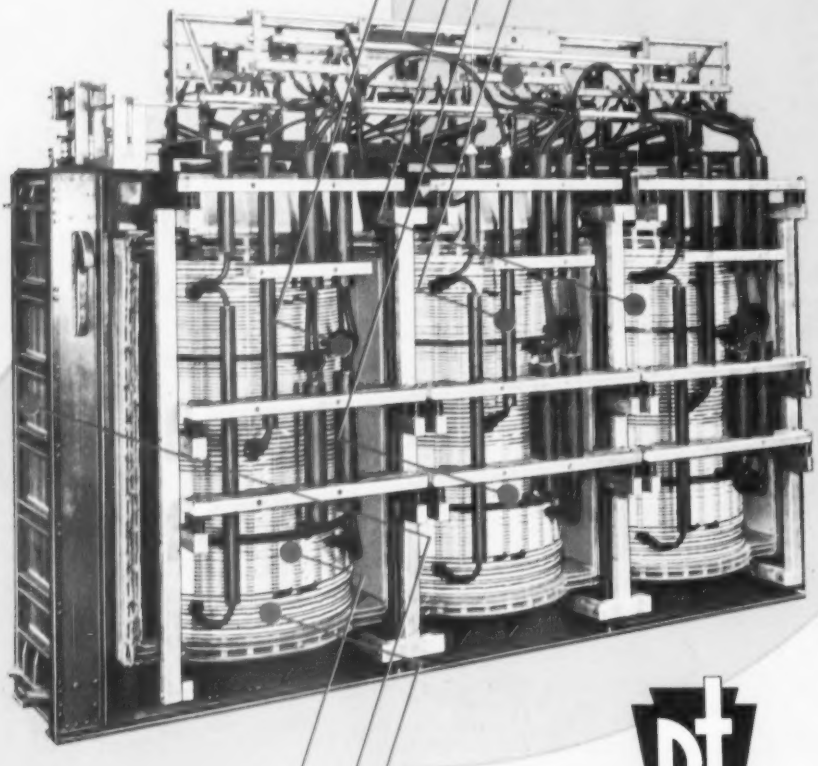
Two sets of taps per coil assure excellent electrical and mechanical balance in the windings.

Tap changer located above core and coils for easy access through cover of transformer.

Continuous pancake winding in High and Low Voltage coils. Helical winding in Tertiary coils.

Taps are located in the High Voltage windings (132,000 volts) as well as the Low Voltage windings (67,200 volts).

All leads are well supported and insulated in heavy pressboard tubes.



Coils are precompressed with a force equal to the highest short circuit stress and built into transformer at that compressed dimension. This prevents mechanical distortion of the coils if short circuit stresses occur.

Five-legged core reduces shipping height.

Extra heavy insulation at line ends of coils. Graded insulation at ground ends of coils.

For exterior view of this transformer, see other side.

60,000 Kva forced-air-cooled/48,000 Kva self-cooled. Three phase, 60 Cycles, 55°C. Temperature rise. High Voltage: 132,000 Grd. Y. volts. Low Voltage: 67,200 Grd. Y volts. Tertiary Voltage: 13,200 Delta volts.

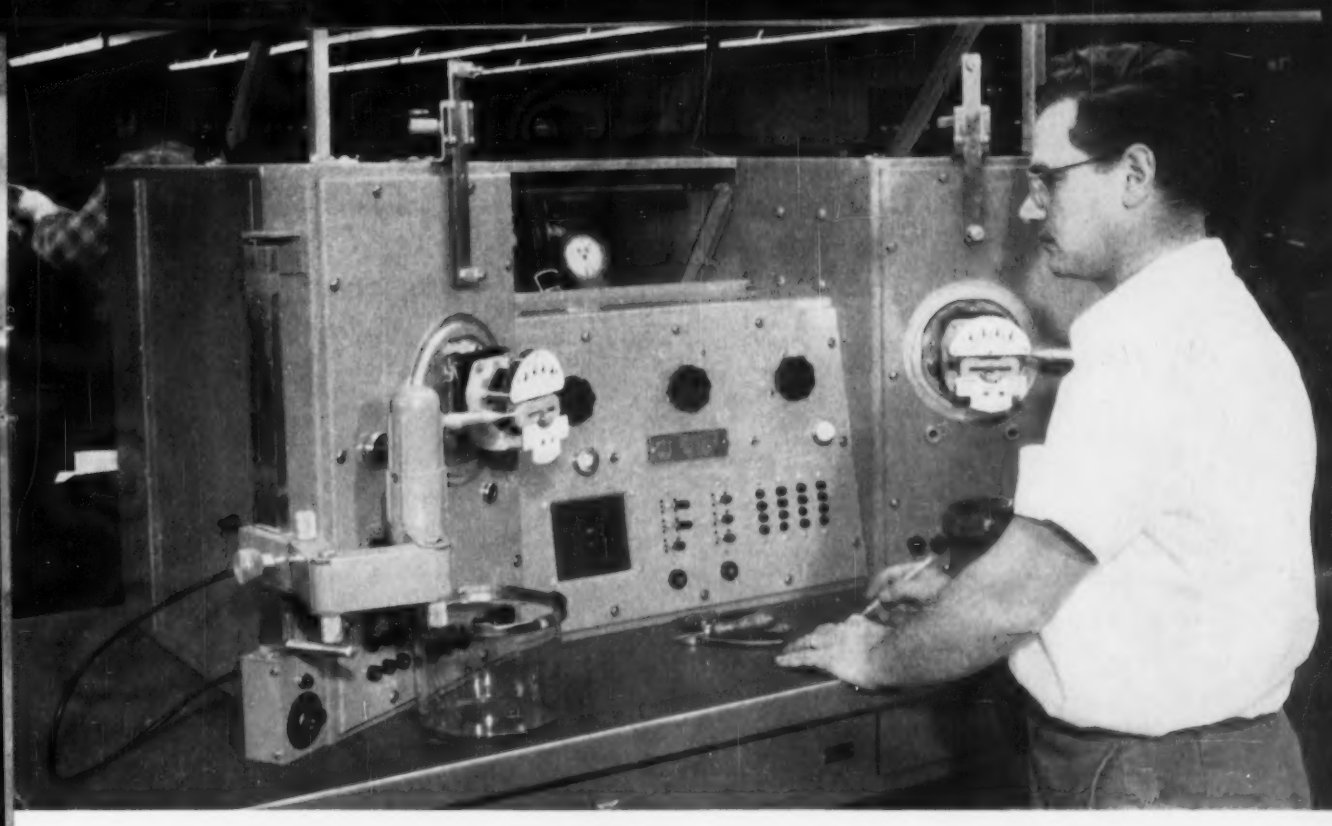
Weight of complete transformer filled with oil — 356,700 pounds.

PENNSYLVANIA TRANSFORMER COMPANY

A McGRAW ELECTRIC COMPANY DIVISION

CANONSBURG, PENNSYLVANIA

Greater Pittsburgh District



LOOK TO YOUR OWN RECORDS

for unbiased proof of watthour meter performance

Want to know the facts about the watthour meters on your company's lines? How they stand up in service? How accurately they retain their calibration—what it costs to keep your meters on the line? Then, look to the test records and accuracy reports of your own Meter Department—kept for your information as a company executive.

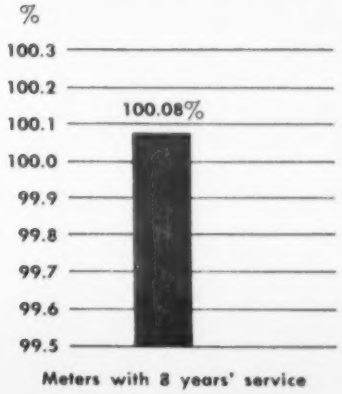
We think that you will be surprised—and pleased with the performance of the Sangamo Meters on your lines.

Shown below are meter accuracy records from one large operating utility that show the average full load accuracy and the average light load accuracy of more than 20,000 Sangamo J Meters after 8 years of service.

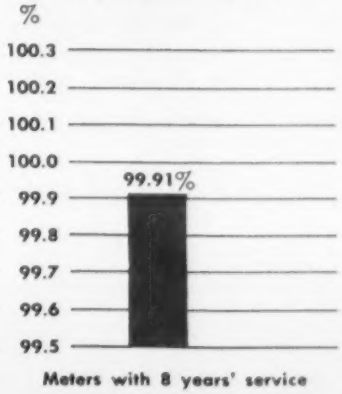
Such sustained accuracy is characteristic of Sangamo Watthour Meters. And such sustained accuracy is the reason why the J2 is your best investment in a watthour meter.

Actual performance records of 20,688 J Meters after 8 years service

Average Full Load Accuracy
20,688
SANGAMO J Meters



Average Light Load Accuracy
20,688
SANGAMO J Meters



SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

JM57-3

A question for every electric utility

CAN LOAD GROWTH BE HANDLED WITH LOWER INVESTMENT COSTS?

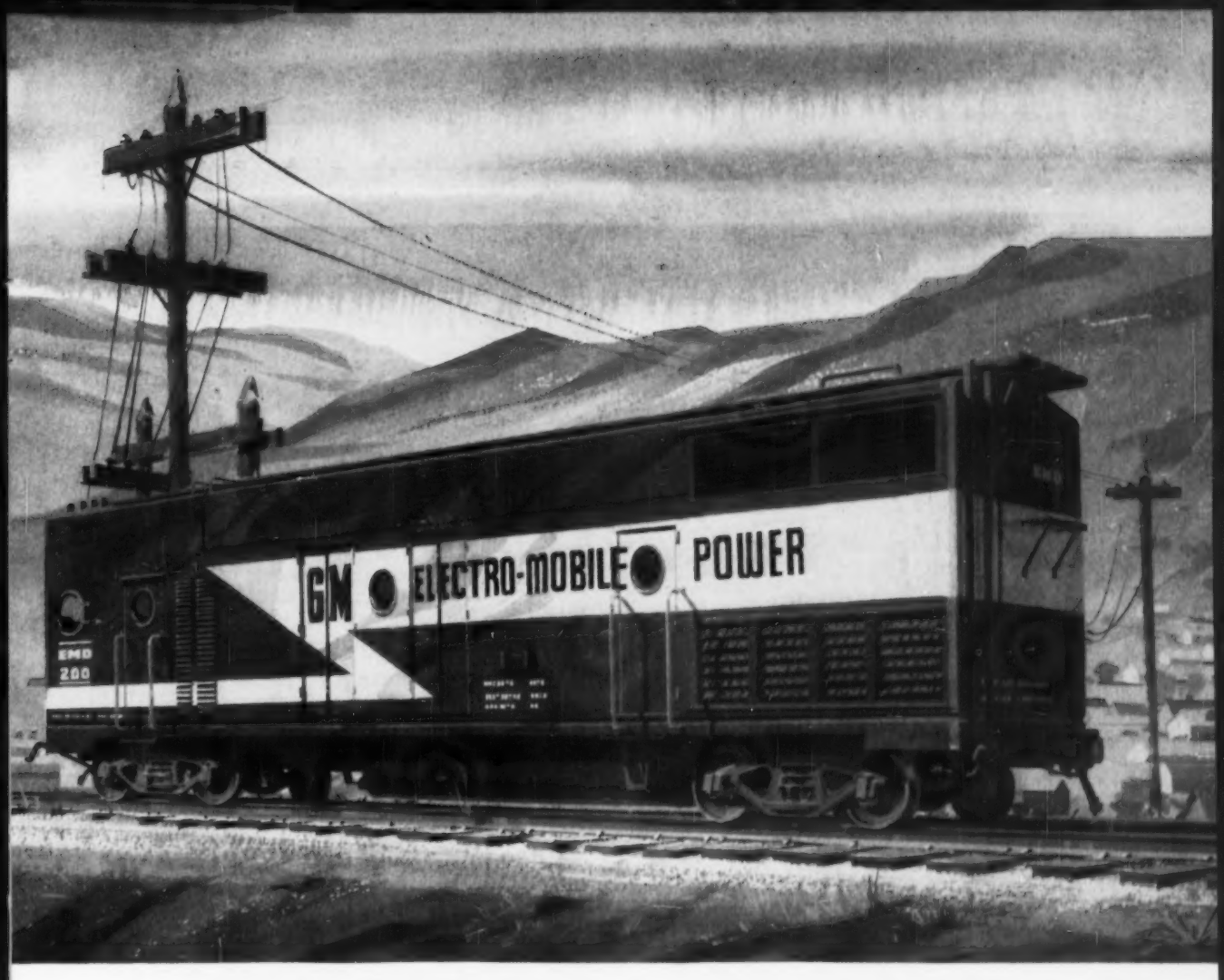
Our unequivocal answer to this question is, "Yes . . . and with greater power flexibility too."

Demand for electric power cannot always be controlled. Today's budding load growth area may well fall short of tomorrow's expectations.

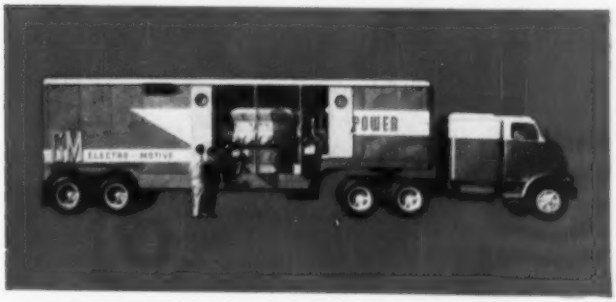
The point is this: planning for increased power facilities necessarily precedes potential requirements by two to three years. Must, that is, unless a method can be devised that will permit the economic employment of units of power to handle load requirements as they develop, thus permitting a more realistic, longer-range selection of site and size for permanent installations.

Electro-Mobile Power provides the base for just such a program. It can be moved from one load center to another. It can be used in multiples to handle either building or diminishing demand. In short, it can follow the demand until such time as it becomes economic to build permanent facilities in the most advantageous location.

Can load growth be handled with lower investment costs? We think joint analysis of your own growth plans is the shortest way to an affirmative answer. Let's discuss it. Contact your nearest Electro-Motive representative for details.



As demand increases in the load growth area, Electro-Mobile rail units like this can be added or subtracted in 1000 kw increments to match power requirements exactly, at lowest cost. After demand has been established, permanent facilities can be erected in the most economical and desirable location. Electro-Mobile units offer the most advanced electrical engineering, equipment and controls. Rail units may be placed on sidings as shown here or mounted on piers for semi-permanent use.



Electro-Mobile trailer unit is remarkably adaptable to many temporary uses because of its quick mobility. Trailer units have 500 kilowatt capacity.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS

LA GRANGE, ILLINOIS

Sales Offices in Chicago, New York, St. Louis, San Francisco

ELECTRA'S HUSBAND

How to Retire -- An Interview

SUMMER felt good again. It was nice to sit on the patio, properly armed, and wait for the guest to arrive. In confidence, we didn't really care when the guest arrived. We were both tired from a busy day in the yard and looked toward an evening of strained conversation with little enthusiasm. Charlie would not be an easy guest.

"What's Charlie doing now?" queried Electra.

"I dunno, retired about six months ago—life of Riley I guess—only to hear Charlie tell it it would be like the seventh circle of hell."

"What's the matter with men?" Electra mused. "I've been pulling you out of bed for a hundred years, listening to you moan about being overworked, then I'll bet the day you retire you meet the 7:22 with tears in your eyes."

"Would you like to hear my comments on women's fashions — or would you like me to play back that tape recording of your bridge club? That recording is the greatest. . ."

"Answer the door," Electra commanded, pleased with a change of topic.

The Charlie that strode in tanned and smiling was not an old man, although he had passed 65. He was not the man that had retired, nor was he the man we had known for some years.

"Charlie, you look great!" I boomed, "retirement agrees with you."

"Happy as a clam at high tide," Charlie chirped.

I noticed Electra catch a smile at the exuberance Charlie emitted.

"What brings you down to these parts? Thought maybe you would be in Tahiti." This had the wrong effect, Charlie turned serious.

"I want you to write an article," he blurted.

This was a switch; for Charlie was not an editor's delight. So I countered, "Let's get comfortable and hear about your retirement plans and then we will talk about an article."

"Well, that's what the article is about—*how an engineer should retire*."

"How should an engineer retire?" asked Electra, and then with a switch of the hand, "take this down."

"Well, first I had it all wrong, I was nervous as a hop toad in a thumbtack factory about retiring."

I roared as Charlie continued. "Well, to put it bluntly, I thought I would be useless, sort of kicked out for the convenience of the younger guys."

"What changed your mind?" said Electra, pressing the point.

"Well, I was sort of saved by happenstance. After I had nearly driven May mad, Joe Fontaine called and asked if I would come up and give him a hand on a design problem. He's taken over that outfit up north, you know, and this was his first go at expansion in some time. Frankly, I would have walked to Siam to use the slip stick. Joe asked what my fee would be. For you, one Martini, I replied, but it got me to thinking.

"When we got finished with the work in a day or two Joe presented me with a check for $250 and gave me a good talking too. He told me that I had saved them two months work. Get it, *experience pays—even after* 65; and that's what I want you to write the article about. That, plus how to keep books on your expenses since much of what you used to do for free is now a business expense. Now I keep a book . . ." and Charlie elucidated on things that would make the revenuers blush.

"Have you done much work since?"

"Have I?" and out came the black book. "Why, last month my billing was $1,028 and that's more than I used to make at the power company. Of course that's more work than I want to do as a steady diet. But I'm going to take it and have a vacation, taking May to the islands. And this trip I'll enjoy—'cause I know when I get back I can still be useful. That's why I'm here to get you started on the article in case I have an accident riding a surfboard."

Charlie was riding high indeed.

"Another thing that ought to go into the article is my change of attitude toward young people. I used to view them as opponents that were ordained to win my kingdom from me. Somehow now I see that they are naturally eager to profit from my experiences and are darn bright and clever in adapting my experiences to today's problems. Now we *complement* each other—you see, I don't have a kingdom to protect any more.

"You see, with the engineering shortage there is the possibility of forming whole consulting firms with retired guys like me doing whatever they want in the fields they know best. They do that in the east, you know. A bunch of us are talking about it now."

"Seems that you have retirement well organized—but how about the rest of the gang that went out with you?"

"Well, they have as many activities as people. Gus Howard is raising hybrid carnations, Pete Thompson travels, but Joe Driscoe has an angle that ought to be in your article. He's teaching. He's always liked working with kids so he teaches two classes up at the U in his special field. The U is darn lucky to get a guy like Joe—and the kids are wild for his down-to-earth approaches. Joe has a bunch of us up as guest speakers—every once in a while one of the younger profs sit in—so it's very rewarding."

Charlie's enthusiasm sobered again, even turned a bit sheepish. "You will write the article for me, won't you? Charlie was hurting so I replied: "Sure sounds like a great yarn — and it's great to hear *you* say it."

"Bully!" Charlie boomed, "the important thing to get over to a guy who is nearing retirement is that it is sort of like getting a promotion into the job of your dreams—if you play it right. Get it, if you don't let the darned thing fool you."

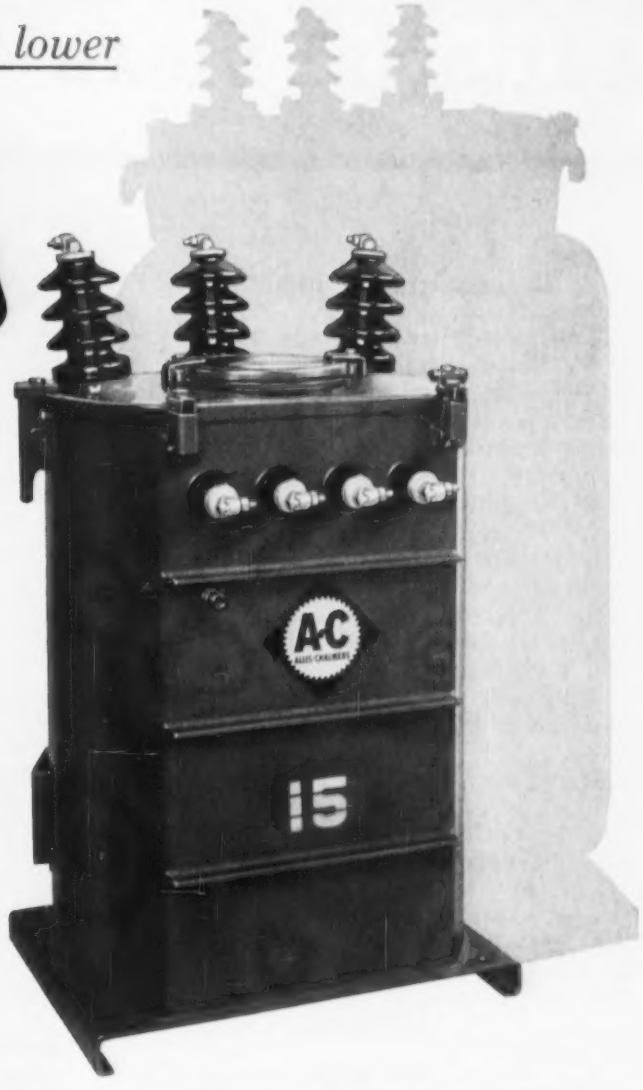
"Charlie, you are wonderful," effused Electra, and then with a wry smile, "it's no fun being nervous as a long-tailed dog in a rocking chair factory, is it?"

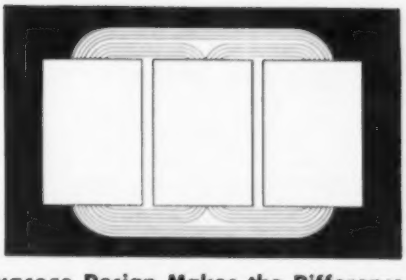
"Say, that's all right, Electra."—and out came the black book.

as much as 17½ inches lower . . . 33% lighter

ALLIS-CHALMERS
DISTRIBUTION TRANSFORMERS

NEW Curvacore design means Greater Capacity on existing poles





Curvacore Design Makes the Difference

Curvacore design, permitting the maximum use of preferred oriented steel, results in a compact core with low losses and low exciting current. Transformer height and weight are reduced considerably.

THE size, weight and resulting installation economies a three-phase transformer has over three single-phase units are now greater than ever.

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editorial views

Jurisdictional Jumble

A persistent trend toward integration of several phases of construction into a single unit is bringing with it labor pains. Ironically it is increased labor costs in building and in the materials employed that is driving the trend more and more into being. Examples are the complete electric kitchen, the luminous ceiling or wall, the prefabricated house or even partition. Each is the combination of several materials and several crafts. Of course each craft claims all of the labor in each case.

The poor confused contractor (yes and the architect and engineer are confused as well) doesn't know who is to do what. The electrical workers and carpenters wrestled out a compromise for luminous ceilings only to have acoustical men become electrical contractors. Latest twist came when the sheet metal workers won a jurisdiction decision because the louvers of a louverall ceiling were of metal. Just who puts up what T-bar to support what part of what becomes very involved and very expensive. Also silly.

The entire building industry would do well to face the necessity to do more integration of unions and contracting to fit in with a trend that it cannot buck forever successfully.

New Reading

PUGET Sound Power & Light's second survey of customer opinion shows a significant rise in sentiment for partnership power policies in the western Washington region. A year ago partnership and cooperation in the power field was favored by nearly three to one. This year four out of five people thought that partnership was the right way to develop power facilities.

By a two-to-one ratio they rejected the idea of a single large free enterprise company for the Pacific Northwest and they were three to one against the idea of an all-federal power system in the area. A very positive expression (five to one) of a preference for local control of electric utilities also was a significant fact developed from the survey.

The general public in the Pacific Northwest probably has been subjected to more haggling over electric power philosophy than any other region of the country. They have listened to claims and counterclaims and have as heterogeneous a group of power supply agencies as will be found in any place in the country. Municipal systems, PUDs, business-managed electric companies can be found there in assorted sizes plus a dominant role played by the Bonneville Power Administration. With this background it is interesting to observe that people as a group come up with decisions that are reasonable, logical and basically sound economically. By no stretch of the imagination can the results be interpreted as a passion for power ideologies of any nature. It would not be too surprising to find that the attitudes of the people in the Northwest are not too dissimilar from those of people elsewhere in the country.

Muggy and Warmer

THIS session of Congress may go down in history as comparable to those in the mid-30s when the politicians made political capital out of using the electric utility industry as a whipping boy. Pressures against the business-managed companies seem to be building up at a rate that is nothing short of alarming.

One block in Congress, egged on by public power supporters, has touched off an investigation that would lead to the censoring or curtailing of electric company advertising in some manner. Although the main target of this campaign is the Electric Companies Advertising Program (ECAP), the area extends to booklets, publications and other litera-

ture which the companies may put out to explain their positions or policies. The object is to prevent any such advertising from being charged to any operating expense accounts. The theory is that, if the editorial content of the advertising can't be censored, it can be made financially painful. Clyde Ellis, Washington representative of the electric co-ops, is going still further in attempting to have the Federal Trade Commission investigate what he calls "false and fraudulent" electric company advertising. The Federal Power Commission and state regulatory bodies are being drawn into the fracas via the accounting route.

Another block of legislators, not much different in composition than the first, has teed off on the rapid amortization certificates that have been issued to electric utilities. Blithely overlooking the fact that tax amortization is merely tax postponement, these zealots hope to get a lot of political mileage out of "exposing" favoritism for the electric companies.

Still another block, again not much different in composition than the first two, is sniping at all forms of partnership as applied to power developments. This, of course, is aimed at promoting full federal responsibility and the perpetuation and enlargement of the preference treatment. Cynics might gage the strength of this block by the fact that the Department of Interior has called a temporary halt on recommendations for the partnership development of the Trinity project in California on the grounds "that some of the supporting evidence to the original contention may have been erroneous."

Finally, there is the little band of public power zealots who are trying to make a case for federal development of full-scale atomic power stations. This group, using the effective smoke screen of national defense, envisages the opportunity for unbridled, untaxed competition with business-managed companies everywhere in the country. The most ardent of them see the federal atomic power program as the quickest and most devastating way to smash the taxpaying electric utility industry.

This four-prong assault against the electric companies is something that the business-managed utilities cannot ignore. At the least it could demand an embarrassing volume of explanations. At its worst it could result in damaging legislation and a retreat all along the line of the free enterprise front. There are those who might take comfort in the fact that the electric companies are telling their story too effectively to suit the public-power politicians; that this activity is merely a counterattack aimed at putting the industry again on the defensive.

There is only one conclusion. The position of the business-managed utilities is being challenged in a way that has not been seen since the height of the New Deal. Its opponents are obviously utilizing every means of harassment to keep it off balance and on the defensive. They could succeed if the electrical industry does not close ranks still further and fight back with every resource under its command.

MECHANICAL energy, under government monopoly, can become a vehicle of tyranny and discrimination, degrading and demoralizing to the citizen and destructive to his freedom as well as his investments . . . . In this day when so many are clamoring for government crash programs in the fields of electrical and atomic power, we need to remember that some things are more important than speed. — Harllee Branch Jr., president of the Southern Co., before the 45th annual meeting of the U. S. Chamber of Commerce, Washington, D. C.

Interview with General Electric's

GLENN B. WARREN

Vice President and Consulting Engineer—Turbine Division

Steam And Gas Turbine Power Plant Developments

Q Estimates for the growth of the utility industry represent quite a challenge for a turbine manufacturer. What measures are G.E.'s Turbine Departments taking to meet this growth?

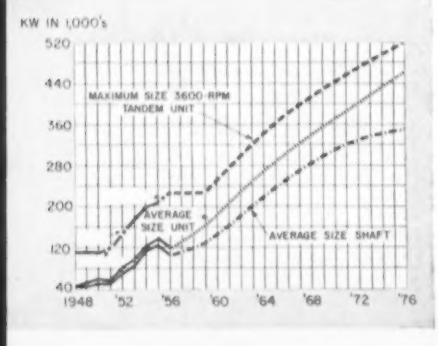
A Growth in capacities is a challenge imposed on us by the general economy, but the utility industry complicates this for us by a more difficult challenge—this is the great need for economy of initial costs, and operating costs of their equipment. And we are judged on the degree to which these needs for economy have been and will be met.

Q Can you summarize some of the recent developments or some potential developments which will help you meet this challenge?

A We are applying the best engineering and development research methods in many technical areas. But there are about seven major paths of progress in our activity where I can cite current developments. These are increased unit size, increased steam pressures, the use of double reheat, longer last-stage buckets, turbine drives for boiler feed pumps, the gas turbine, and atomic power.

Q What is optimum size?

A There is no one answer to that question. We can suggest that on an isolated system, the size of the largest unit should probably and most economically be 7 to 10% of the total system capacity, but interconnections make possible much larger units. Looking to the future, the chart below shows the average- and maximum-size large steam turbine-generator units we have shipped in the past 10 years. Curves are extrapolated to 1976.



Q What do you predict in the area of steam pressures?

A I think that there is much reason to believe that the increase in steam pressure (which has doubled about every 12 years) will continue for some time. However, I strongly suspect that after 5,000 to 6,000 psig is reached we may be reaching the point of diminishing returns on even larger units.

Q Are there further economies to be gained in higher temperatures?

A Initial and reheat temperatures have steadily increased. Initial temperature has increased almost 12 F per year for the past 50 years. Here again, I think we would make a mistake to feel that this continued increase in temperature in the steam cycle will continue unabated at this rate. There is much evidence that as we exceed 1050 F, superheater, piping, and turbine costs are increasing faster than the corresponding gain in reduced fuel consumption on resuperheated plants.

Q How about potential gains in the low-temperature end of the cycle?

A By using longer last-stage buckets, double flow in place of single flow, triple flow in place of double flow, etc., by installing supplementary cooling towers which should reduce the disadvantage of hot summertime cooling water both on economy and capacity, it may be perfectly feasible to obtain 1, 2, or 3 or more percent greater plant capability at the critical peak load period and increased year around economy.

Q You mentioned turbine drives for boiler feed pumps.

A Yes, we think they should contribute to the efficiency of station operations. For example, they can help increase reliability of the main shaft by reducing the amount of load it has to carry. For larger higher-pressure units, we believe variable-speed turbine drives for these high-speed, high-pressure, boiler feed pumps will be efficient and reliable.

Q What role will gas turbines play in the electric utility industry?

A We have on our drawing boards potential machines which it appears will reach capabilities of 30,000 to 35,000 kw or probably higher, and will have overall economies of fuel consumption that will surpass that of comparable size steam plants. Some of these plants are arranged for automatic operation. We expect real progress in the not-too-distant future with coal-burning gas turbines, and in the area of combined steam and gas power plants. We believe this new power tool will have important applications both as peakload, end of line, or base load plant application when used alone or in conjunction with steam plants.

Q What about the atom?

A It appears highly probable that within the next 10 to 20 years, the energy of the atom will be used widely as a source of heat for either steam or gas turbines, and we are preparing for that day.

Q Do you think the trend to lower fuel consumption per kw-hr will continue?

A Much of the potential gain in economy in the steam cycle has been made, and this—at the beginning of a tremendous capacity expansion on the part of the utility industry—is fortunate. On the other hand, there remain many areas, some of which we have just touched upon, in which we can together attain still more economy in power production so that we will continue to help the utility industry in lowering the cost per kw-hr.

For further information, contact your local Apparatus Sales Office, or write for a copy of Mr. Warren's detailed comments, GER-1364. General Electric Co., Section 301-358, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST

VOL. 119, NO. 1
JULY 1957

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

People just don't know the facts about the electric utility industry or the implications of government encroachment on business and freedom. When the public is informed, the problems of tax equality, preference and subsidies disappear as political issues. Mr. Vennard told the PCEA annual convention what can be done. How to do it . . .

E. A. Vennard
Managing Director
Edison Electric Institute

This Is Our Challenge

There are many reasons why America has risen to its present position as the strongest, most progressive nation in the world and the fountain-head of freedom. Part of the answer lies in our national character; part is due to the form of government established by the founders of our country; and our economic system based on the theory of free enterprise is responsible for part.

Electric power has played a major role in America's development. Since 1882, electric power has grown more important to the country's welfare and continued progress with every passing year. America's power capacity has been increasing much more rapidly then its population. People are using more and more electricity, with a resultant increase in their standard of living. Since 1916 our population has increased about 67% while the electric industry's generating capacity has increased 1,371%.

The United States has more electric power capacity than the next seven countries of the world combined. We have about four times as much power capacity as the next ranking country, Soviet Russia. The American electric light and power companies alone have installed new capacity in the past five years equal to all of the present installed capacity in Russia and will build, in the next five years, more new power capacity than the total now installed in Russia.

Sometimes we hear of a kilowatt race between America and other countries. We have already won the kilowatt race and we expect to keep on winning it by installing new power capacity to keep America ahead. In Russia, where the government plans, owns and operates all the power facilities, there is a total installed capacity of 32,000,000 kw for 200,000,000 people as compared with America's 120,000,000-kw total to serve 170,000,000 people. Under these circumstances there can hardly be any comparison of the state of development of electric power in the two countries. The so-called race is in reality a myth.

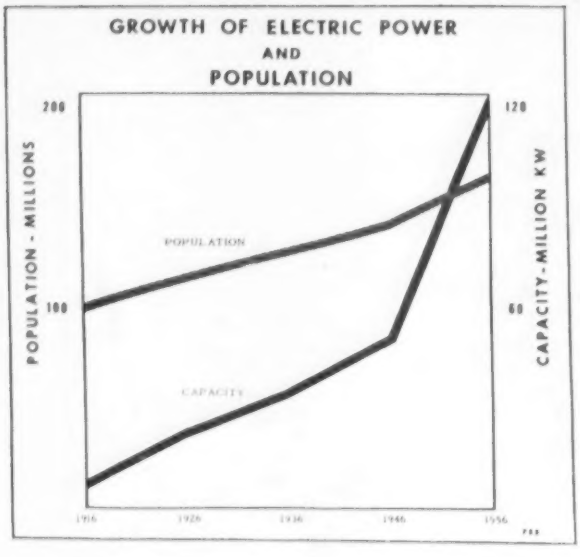
The Price Record

Anyone looking over the price record of the electric light and power companies must describe it as good. It speaks well for our system, under which the business is done by businessmen while men in government act as regulators. It is the result of a combination of many factors. As a result of constant gains in operating efficiencies, a careful watching of all expenses and the constantly increasing use of electricity on the part of the public the average revenue from residential customers per kwh of electricity is only 34% of what it was in 1916. By way of comparison, the cost of living is now about two and a half times what it was in 1916.

This record speaks well for the free enterprise system, under which free men compete with each other for incentives provided by the consuming public at the market place. It speaks well for the system of government regulation of the utility business. State and federal regulation bodies have helped to insure that both the customers of the company and the investors in it have been treated fairly.

The power companies are carefully regulated—by the state commissions for intrastate operation and by the Federal Power Commission for interstate sales of electricity at wholesale. These commissions have three main responsibilities: (1) To insure adequate electric service; (2) to prevent unjust discrimination among users; and (3) to establish a fair price from the standpoint of both the customer and the investor.

How well has our regulatory sys-



"American power capacity has been increasing more rapidly than population"

tem met these responsibilities? As to the first, this system of government regulation has worked well because all demands for electricity have been met by the regulated companies. As to the second, there are few complaints concerning discrimination. As to the price, the record speaks for itself.

Atomic Energy

No discussion of the industry's future would be complete without mention of the new and growing field of atomic energy. It was not until the latter part of 1954 that industry was permitted for the first time to develop and construct its own nuclear power plants. Today, exploring and improving the use of nuclear energy as a power source has become an integral part of the everyday activities of our industry in seeking to lower the cost of power for the continuing benefit of the public. At the present time, a little over 2½ years since first permitted to undertake this development, 80 electric utility companies are participating in the development and construction of 14 nuclear reactor projects and one thermonuclear research project. Two other groups of companies have announced they are considering undertaking nuclear reactor projects and, in addition, a large number of companies have been actively following nuclear power development as members of research and study groups or individually under the Atomic Energy Commission access permit program.

Of the 14 reactor projects announced thus far, seven are either under construction or in the immediate preconstruction state, while the other seven are in various stages of planning. When completed, these reactor projects, involving several different types and designs, are expected to have an electric capacity in excess of 1,500,000 kw and to involve an expenditure of more than $400,000,000.

While these projects will add a substantial amount of capacity to the nation's total, this is not the primary reason for their construction. With our abundant supplies of relatively low-cost fossil fuels and the advanced state of our conventional power plant technology, nuclear power technology must be highly developed in this country before it will be possible to make electricity as cheaply with nuclear fuels as with conventional fuels. The present nuclear reactor projects are being undertaken primarily to advance technology, to study methods of cutting costs, to train scientific and technical personnel and to determine which of many possible reactor types are most promising from the standpoint of producing economic nuclear power.

We believe that a comprehensive program of nuclear power development should be carried forward in our country with all expedition consistent with sound scientific and technical considerations and in a manner compatible with our traditional free enterprise system. In this development the resources of industry should be utilized to the maximum extent possible, thereby enabling government expenditures to be held to a minimum. The time, technical manpower and funds being devoted to the present programs of electric power companies and the progress being made are substantial evidence of our industry's determination to help bring about economically competitive nuclear power.

Free Enterprise Benefits

Few of us realize the tremendous advantages of our political system over the systems of other countries. We do not stop to think that Americans, with only 6% of the world's population, use 41% of the world's electric power. The reason for this is the same reason they have 56% of the world's telephones, 71% of the world's passenger cars, 50% of the world's radios and 75% of the world's TV sets. This same reason explains why Americans, who comprise only one-sixteenth of the world's population, working on one-sixteenth of the earth's surface, produce about half of the world's goods.

The reason is that in America the government does not operate business. The business of producing goods and services is conducted by the citizens. The government acts only as a referee and peace officer to maintain fair play.

At least this is how our government was originally set up. The men who founded our nation were strongly opposed to a strong, centralized government. They were educated, intelligent, well-read men. They knew how civilization in the past had won freedom and then lost it through a strong government doing things for the people that the people should have done for themselves. They intended to set up a form of government that would insure its citizens' liberty and freedom as long as the nation survived.

In recent years, however, a new concept of government has been spreading. It has been wholly adopted by some countries and partially adopted by others. It has found disciples and converts all over the world. It promises a perfect state—a Utopia—if the people will only let government control everything for them. It is usually called Socialism. Its aim is to destroy man's desire for ownership of personal property and completely to subvert his will to that of the state.

In the United States the socialists, or those who are in agreement with their aims, have for years been trying to get the government in control of business. Following the pattern set in other countries, the first businesses to come under attack were the utilities.

Government encroachment into the power business is but a part of a much bigger problem concerning man's freedom. This bigger problem

has to do with the kind of society in which men live. As Americans, we have a duty to our fellow citizens as well as to ourselves to help solve this bigger problem. We will be helping when we find an effective solution to our own.

Two Systems Only

In seeking that solution, let us first of all clear the air and prevent misunderstanding over words. When we talk of social, economic and political systems, we often run into confusion caused by the different terms people use to describe these systems. Basically, there are only two systems. At the risk of oversimplification, we can say that there is on the one hand the system under which people rely on their government to do for them those things which they can and should do for themselves. Under systems of this kind, no matter what names people give them, the individual is not free. On the other hand, there is the system under which the individual takes care of himself, with a limited government to maintain order and fair play. Under systems of this kind, man retains his freedom from domination by other men.

The choice between these two systems is the issue that is facing nations everywhere today. It is an issue that has faced people throughout all history, perhaps from the beginning of time. All those systems under which freedom is absent have in common the fact that the government either owns or operates the machinery of production. In all such cases the government owns or operates the power business as part of that machinery.

This is not to say that those in America who believe in so-called "public power" are socialists or communists. Most of them are not; most of them are good Americans. But there is grave danger that, without fully realizing what they are doing, these people may fall into the same trap that has cost many nations their freedom. By far the greater number of people are still unaware of—and therefore largely indifferent to—the dangers inherent in socialized power.

Ignorance Aids Socialists

During the early 'thirties a new technique of sampling public opinion came into being. Two scientists in the field of opinion research, Dr. George Gallup and Dr. Claude Robinson, developed a formula under which the sampling could be carried on with a high degree of accuracy. Here was a new tool to assist power companies in their public and employee relations activities. By this sampling process, it became possible to find out what people liked and what they disliked and to find out what they knew and what they did not know about the power business.

Some individual companies and groups of companies decided to make use of this new tool. They sampled opinion in their own service areas and in larger areas covering many states. By doing so, they learned that they were doing some things that people did not like, and they did less of them; they found out the things they were doing that people liked and they did more of them. That is the essence of good public relations.

While they were doing this, they made another discovery. They learned that many people were very poorly informed about the power business. They learned at the same time that a large share of the unfriendly attitude toward the industry could be traced to a lack of knowledge of facts.

For example, when a person said he was in favor of government operation of the power business, the interviewer asked why. Fully half of the people replied: "To get lower rates." This is understandable. People want the best price they can get.

In one survey, people were asked: "Have the electric rates here been reduced much or any at all?" Only 13% said they had been reduced, while 60% said they had not or that they had risen. Twenty-seven per cent had no opinion. Apparently people didn't realize that the average price of our product—electricity—had been declining steadily ever since the birth of the industry.

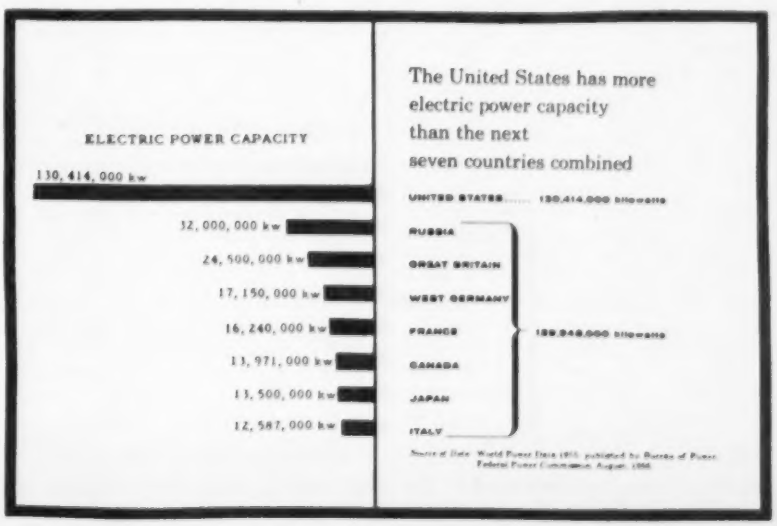
The companies wondered whether, if people knew the facts, the attitude toward government operation might change. To find the answer to this question they embarked on a program of advertising designed to let people know about the power business and its price record. In this advertising they repeatedly used the phrase "the average family now gets twice as much electricity for its money as it did about 20 years ago." From the surveys, they found other instances where people were uninformed or misinformed about our business. They designed programs to give people this information, too.

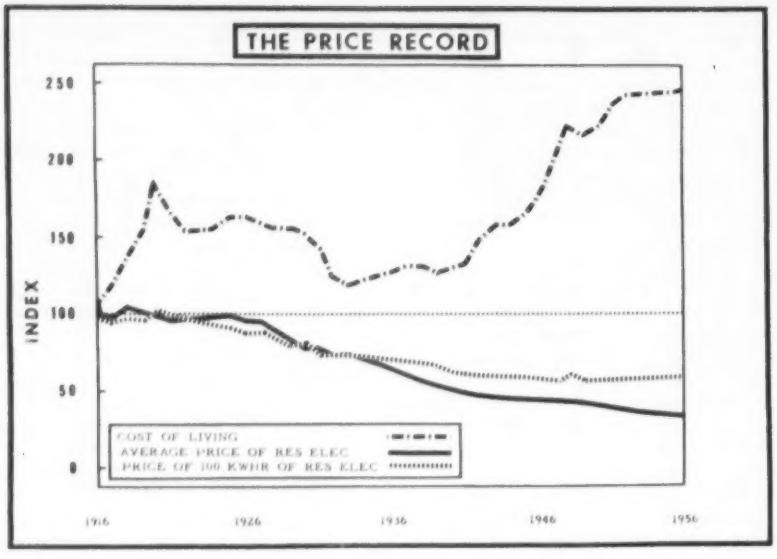
Measurements of knowledge and attitude were made before and after the programs. In every case these surveys showed that when the people had the facts their attitude toward government operation of the power business changed.

Public Attitudes Checked

In the course of this research on public attitudes about the power business, some important and pertinent facts came to light about the kind of society under which we live and about the preservation of freedom. The public opinion surveys often contained philosophical questions. The answers to these questions given in the late '30s showed that a substantial number of people were in favor of some of the same social, economic and political prin-

"We've already won the kilowatt race . . ."





"The price record speaks for itself . . ."

ciples espoused by socialists and communists. There seemed to be a strong tendency on the part of many people to look with favor upon government operation and control of the economy—a tendency on the part of the people to call upon their government to take care of them.

The previous experience with the price issue gave reason for the belief that these attitudes could also be traced to a lack of knowledge of facts—in this case facts about our American capitalistic system, about how wealth is produced, about profits, division of income, the place of machinery in our economy and the fact that machinery has to earn a fair return in order to encourage people to use their savings to buy more machines. Some exhaustive research was carried on to see if this was so.

People were asked fact questions about our economy? How much are profits? How much should they be? How is income divided between the employees and the owners? Are you for or against machinery? Do machines put people out of work? Does government produce wealth? Analyses of the answers given to these questions of fact revealed a great lack of knowledge on the part of many people.

The results showed that when people are informed as to the facts about our American economy, they tend to believe in the free enterprise system; but when people are uninformed as to the facts about the capitalistic system they tend to believe in collectivism—the system under which government operates the economy.

This was a situation similar to the one encountered on the price issue. Uninformed people were thinking in terms of government operation of the economy. This fact gave reason to believe that if they were informed, they would favor the principles of free enterprise.

To see if this reasoning was valid, experiments were conducted in various places and with different types of communication mediums. The interesting fact is this: In every case, as people learn more about our American free enterprise system, they tend to become more strongly in favor of it.

Correlation Proven

These efforts have established an unshakable correlation between information (or the lack of it) and basic philosophical beliefs. Today we as an industry are faced with a philosophical problem which is as old as time itself. This philosophy of "government take care of me" and the loss of freedom inherent in it has plagued mankind since the beginning of history. It is an evil thing.

For years people in the power industry have been asking themselves, "Why does government encroachment in the power business continue today despite our excellent record in the areas of engineering, finance, sales, economics, price and service? Why does it continue despite the fact that a substantial majority of our people don't want it?" Perhaps now it is safe to say, on the basis of this research that has been done, that it continues because the great majority of the American people are unaware of these basic facts: (1) Government gives tax money without interest to federal power projects, which are purely commercial operations; (2) government lends tax money to further these commercial power operations at an interest rate below the market price; (3) tax discrimination; (4) preference or discrimination in the sale of government power.

In the case of TVA, for example, the federal government has given $1.4 billion of taxpayers' money for the building of power facilities. The government charges no interest and TVA pays no interest on this money. In other cases, the federal government lends tax money for the building of power facilities and charges an interest rate which is less than the value of the use of the money. Government power projects pay no federal income taxes at all and, in most cases, no local taxes. On the basis of percent of gross plant investment, TVA for example pays in tax equivalents about one-twenty-seconds of all the taxes that power companies pay.

The preference clause is a device under which the 80% of the American people who get their power from taxpaying power companies are discriminated against in favor of the 20% who get their power from a supplier exempt from federal taxes. As will be shown later, government subsidies enable government power projects to sell power below cost at the expense of the nation's taxpayers. The preference clause states that public bodies and cooperatives shall have preference in the purchase of this subsidized government power. Thus, the preference clause tends to perpetuate and expand the evil. It encourages the formation of even more tax-free groups. Now, when our government expenditures are at a record level, a wide and equitable sharing of the nation's tax load seems imperative.

Is TVA Constitutional?

TVA is a good example of a government power project. An analysis of the TVA power business will show how the factors under discussion enable government encroachment to continue despite the fact that it is against the will of the majority of the people.

TVA has changed. The complexion of TVA has changed over the years. Originally, it was intended to be a project for the building of a

". . . creating a climate of public understanding which will enable our companies to continue to sell power as we have in the past is not some kind of frill which we do not need; it is an integral part of the sales process."

series of dams primarily for flood control in the Tennessee Valley and navigation on the Tennessee River. All but 1% of TVA's electricity was hydro power in 1939. Electric power generated at these dams was to be "incidental" to the primary functions because it was believed then that under our constitution the federal government could not build power plants for the sole purpose of generating and selling electricity. The incidental electric power was to be sold to the people of the area.

The TVA Act does not authorize TVA to build steam plants. The generation of power for sale is a business and, like all businesses in America, is a function of its citizens and not of the government. Now, about 75% of TVA's total generation is by steam plants. Most of the growth of steam power has occurred since 1950.

And so we have in TVA now a project whose dominant purpose is the generation and sale of electric power. The federal government is in the power business in a big way, operating on subsidies provided with the taxpayers' money.

Our experience indicates that only a few people know that the TVA has never been declared constitutional. Only two cases regarding the TVA have been decided by the U. S. Supreme Court. In the Ashwander case, decided in 1936, this court upheld the right of TVA to purchase transmission lines from a power company in order to transmit power from the Wilson Dam which had been constructed during World War I as a national defense measure.* In 1938 in the "19 Companies" case the Supreme Court dismissed the case with the statement that the companies had no standing to maintain the suit.

A very small number of people realize that the federal government is lending money to other power projects at an interest rate below the market price. In a survey made this year by Opinion Research Corp. this question was asked: "Does TVA pay taxes the same as private companies do?" Only 36% of the people know that TVA does not pay. Sixty-four per cent do not know this fact. Then this question was asked: "Do you think TVA should or should not pay taxes the same as the power companies do?" Of those asked, 54% say it should. Twenty per cent have no opinion. What would their opinion be if they knew they were being taxed more than otherwise because TVA is not taxed?

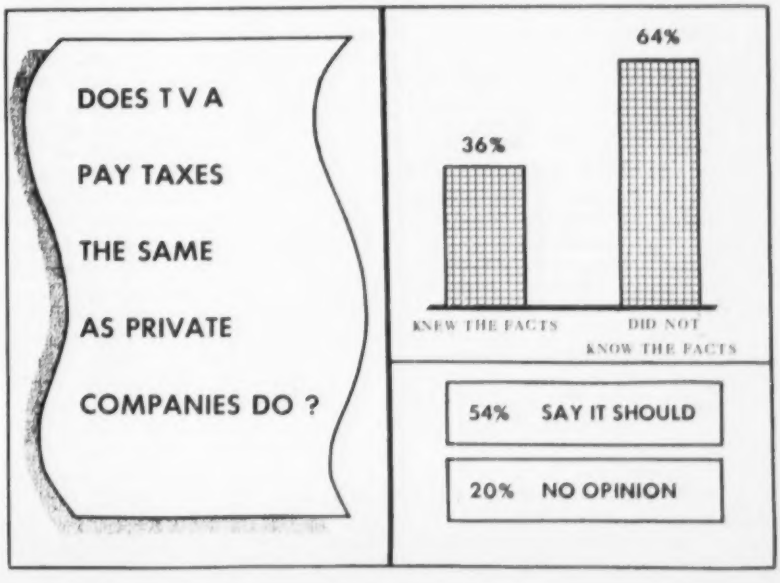
Then this question was asked? "Do city-owned plants pay federal taxes the same as private companies do?" Only 17% of the people asked knew the right answer to this one. Over four-fifths of them were uninformed or misinformed. When asked if they should pay these taxes, 77% said "Yes." Can there be any stronger evidence of the relationship between knowledge of facts and opinions? We have those facts. Are not the people we serve entitled to them?

Here again we observe a strong correlation. There is a lack of knowledge of fact on the tax question; there is also evidence to indicate that the American people are opposed to this tax discrimination when they are informed as to the facts. The key to the solution of our problem is telling the facts to the people. This discrimination will stop when American people want to stop it. They will want to stop it when they are informed. They will be informed when we resolve to tell them.

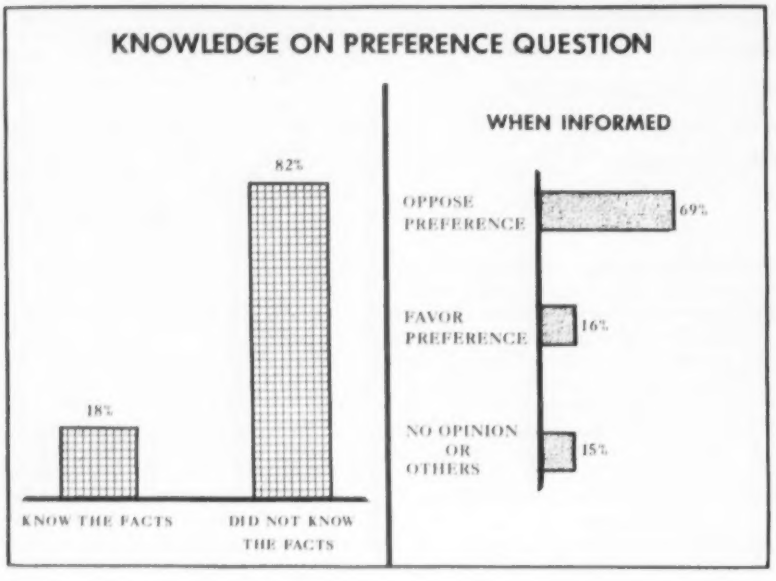
People are also uninformed on the question of preference. In this year's survey, this question was asked: "Do all groups have an equal chance to buy electricity from a federal project?" Only 18% of the people questioned knew the facts. Again, more than four-fifths of our people are uninformed or misinformed on this question. Furthermore, the survey shows that when people are informed, 69% are opposed to the preference idea. The reason we still have preference is that we haven't informed people. The fault is not theirs—it is ours.

These studies and surveys enable us to trace the reasons for continued government encroachment to a lack of knowledge of facts on the part of a substantial majority of the American people. Our duty seems clear. It is to tell people the facts. Each of us here must decide for himself what he will do on these important matters. We have within our hands valuable tools with which we can cope with government encroachment

"There is a lack of understanding on the tax question . . ."



* The issue of generating power at steam plants was not presented to the court for decision.
In the Ashwander case, Justice Butler questioned TVA's lawyer, John L. O'Brian, as to the use of steam plants.
O'Brian said: ". . . That steam plant is not in this case. . . There is nothing in this record to show that the Authority ever intends to use it for the purpose of generating power for sale, and I disavow any such intention at this time."
Justice Butler commented: "I know, but you assert the power, do you not?"
O'Brian replied: "No, I do not."



". . . discrimination will stop when people are informed . . ."

into the power business. What is more important, these same tools can help in dealing with the bigger problem involved in the trend toward a system where people depend upon government and not themselves for their personal well-being and security. Knowing this, our task seems clear.

First we have an obligation to our employees. We should measure the extent of their knowledge and information on the American economic system and on the power business. This will be the bench mark which we lay down so that progress can be measured in the future. We should then set up a series of information courses to be given to our employees which will cover the following subjects: (1) The American economic system; (2) The history of American freedom; (3) The power business.

When we come to the power business, we should give our employees information on both the economics of the power business and the issue of business-managed vs politically managed power. Both are essential to a good basic understanding.

At periodic intervals we should remeasure the knowledge of our employees on the basic facts about our system and about the power issue. We should strive to reach a goal of 80% in realization of the facts. If our employees have the facts about these issues and about our economy and about American freedom, we have reason to believe that they will want to keep that system and that they will want to do the things necessary to keep it. We should also measure the knowledge of three other groups—stockholders, opinion leaders and the general public. We should make every effort to bring their understanding up to a satisfactory level.

These activities are important—more important, perhaps, than we as an industry have in the past recognized. There can be no more important or necessary part of the sales picture than price; that is an elementary principle which has been recognized by economists ever since men first began selling things to each other. We discovered many years ago that it was not enough to make the price of our product low. In addition, our customers must know that it is low and that it is fair; and that is quite another matter. It is a fact that effective selling is inseparable from public relations. Unless an atmosphere favorable to the sale exists in the mind of the customer, the potential sale becomes difficult, if not entirely impossible. If more people knew more about our business and the economic principles affecting it, the task of our sales forces would be easier.

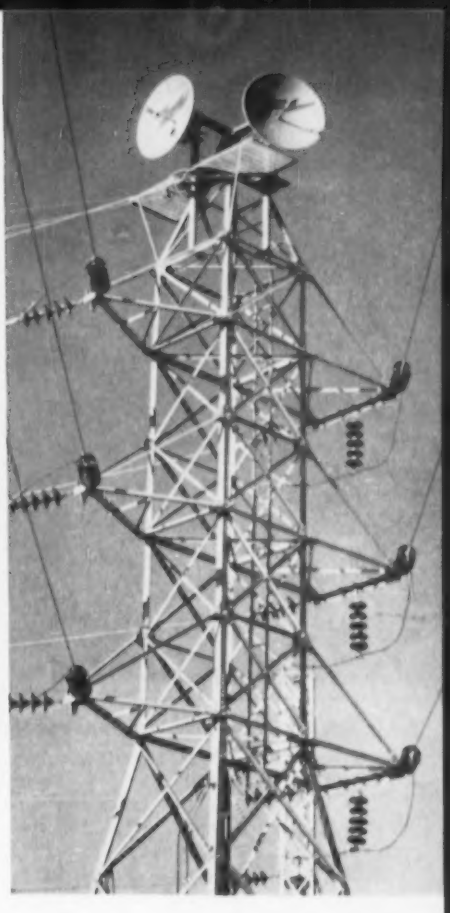
Sometimes our rates are compared with subsidized government power rates with the implication that our price is "high" or that we are not operating as efficiently as men in government. People should know that so-called "public power" is not cheap power; it is just that large portions of cost are absorbed by government subsidy. Considering the nation's electric customers as a group, they pay no less for government power than for power generated by America's tax-paying power companies. It is only a bookkeeping shuffle that makes it appear so.

Beyond this there is another reason prompting us to tell the facts about our business. We as leaders in the power business have a responsibility to the society in which we live—a responsibility greater than that of other businessmen because we know more about the problem. We have faced it; we have developed the means to cope with it. We have evidence to indicate that the solution is in our hands.

We have discovered that there are relatively few people in this country who are aware of the significance of trends toward government in business, as exemplified by the situation we find in our industry. It seems that most of the leaders of thought and action have not yet realized where this course will lead. The duty resting upon the few who do not know therefore becomes greater. We who are aware of what is happening must always do more than our share. If we fail, if as a nation we drift into patterns which spell the end of our freedom and achievement, the blame will not fall on those who did not know it was coming. Rather, those of us who had the power to give the alarm but who failed to do so will be the ones responsible.

Let us remember that ignorance is not eradicated by merely writing letters, mailing out booklets or giving speeches. There is a purely mechanical process for doing this, but doing it means going through all the details of that process. We know a great deal about this. We know that the only way to find out if people think a certain way is to ask them. This means surveying and resurveying, to make sure that our effort is not wasted. We are faced with a difficult task at best. We know what we must do; there seems to be no different or better way of dealing wth our problem. Thus far, there is only this one solution available to us.

Each of us must ask himself what he will do about this problem. The composite answer will determine whether we as a nation go down into darkness as have all the uncounted millions who came before us, or whether we shall preserve for our posterity the great benefits of freedom that we have enjoyed. And therein lies the challenge facing us today. May God grant us the wisdom and the courage to meet it.



Nerve center of the whole system is the dispatcher's office. Here Bill Voss is aided by supervisory control equipment, mobile radio, microwave communications. Right, mounting antennas on existing towers give rigid support, save money

Expanding Southern Nevada Power Co.

Loops System With Microwave

Dwight Hoopes

Chief Engineer, Southern Nevada Power Co.

The Southern Nevada Power Co. is perhaps the first electric utility in the nation, maybe in the world, to establish a *loop-connected* microwave system that *completely utilizes* the advantages of microwave and adapts them to *all functions* required by a power utility.

Being among the first to adopt new electric utility system operating methods or establishing unusual growth records is not new to the Southern Nevada Power Co. For example, since June 1954, when a new management headed by President Reid Gardner took over the firm's operations, the company has grown from a $6,000,000 firm to a $27,000,000 system. The firm's customers have increased by 50%, its energy sales by 100% and its investment in plant property and equipment by 355% during this three-year period.

It was at the beginning of this extensive building program that a decision was reached to place the control of all major substations in the hands of a single dispatcher. This was to be accomplished by means of supervisory control equipment with the most economical communication medium that would be extremely reliable.

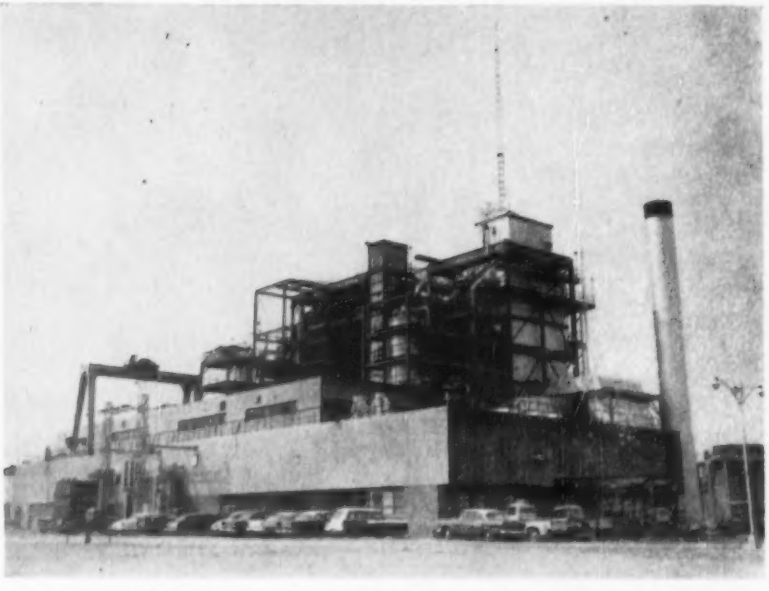
Communications Studied

A study was made of the various interconnection means, such as metallic conductor, telephone company lease facilities, privately owned open wire or multiple conductor cables, carrier current equipment and microwave. After thorough consideration, a General Electric loop-operated, 2,000-mc microwave system was selected on the basis of its use as a point-to-point channel for supervisory control, telemetering, protective relaying including transfer trip circuits, and communication.

Five substations are currently in operation, with the dispatcher situated at the company's recently constructed Clark steam-electric plant. From this point he has control and supervision of all 69-kv breakers in the substations shown in the accompanying diagram as Winterwood, San Francisco, Flamingo and Westside.

The dispatcher receives telemetering indications of the 69-kv bus voltage from all four stations and 12-kv bus voltage from San Francisco and Flamingo subs by individual selection. The dispatcher thereby has an excellent means of checking the over-all voltage of the system. This is further advantageous in substations not equipped with load tap changing equipment to indicate to the dispatcher that seasonal transformer tap changes are necessary.

At present only one indication



Radio shack on top of Clark steam station houses mobile and microwave radio, gives height, saving on tower expense

per substation of the lookout of any 12-kv circuit breaker within that substation is planned. This will mean that the service man can be dispatched immediately in the event that a 12-kv breaker opens rather than wait for a customer to call advising the company of a service interruption. A duplex channel makes possible telephone communication between the dispatcher's office and the substations.

Consideration has been given to the idea of using a supervisory control indication point at each substation door and gate. This would inform the dispatcher that someone had entered the substation and provide a means to call that substation verifying the fact that the persons were there in an official capacity.

Phase Comparison Relaying

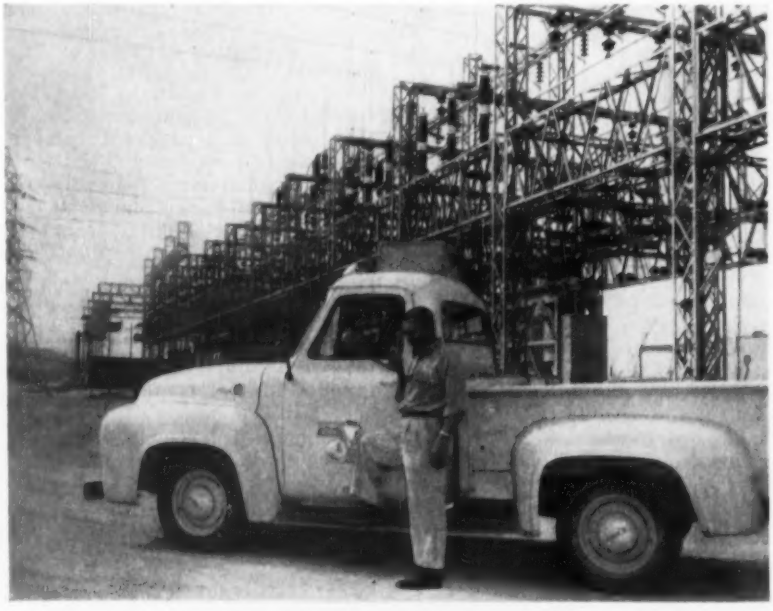
While all power utilities employing microwave have used it for voice, and a majority for supervisory and light metering, only a handful have entrusted the relaying function to this new medium. This installation is the first to utilize microwave relaying for so many lines and stations. Since the protected lines are untapped, phase comparison relaying with its inherent simplicity was selected.

North Las Vegas and Alta substations are scheduled to be built within a year. They will be tied into the 69-kv loop and will each house a number of 69-kv breakers. With the installation of microwave and supervisory control in these substations, the microwave loop will be completed.

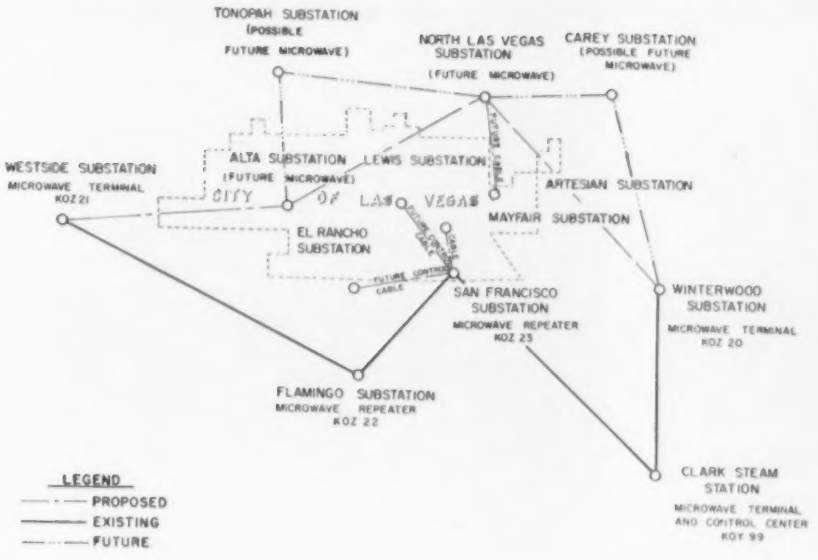
Loop Adds Reliability

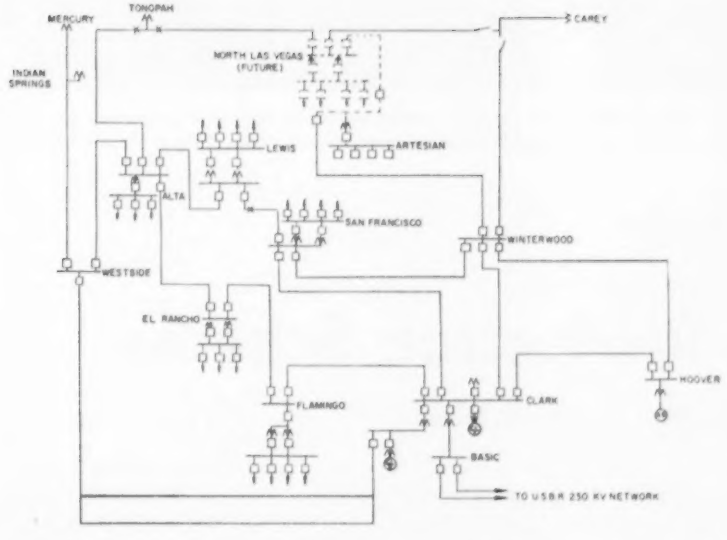
Original system planning considered a radial system extending outward from Clark with individual microwave links to each substation. While this seemed at first to offer the most reliable operation, serious frequency congestion probably would have developed.

The geographic location of the substations and 69-kv loop philosophy made it possible to obtain many advantages by looping the city with microwave as well. When the loop is completed this year, supervisory and relaying signals between Clark and the various outlying substations will be transmitted in both directions, adding one more degree of reliability to the system operation and thereby taking advantage to the full-



Mobile radio keeps system dispatcher, repair crews in touch while in stations





Diagrams of transmission and microwave systems show looping features of each

est of the fortunate geographic layout.

This will make possible the removal from service of the microwave equipment connecting any two stations without affecting service on the supervisory control, telemetering, relaying and communication equipment in any of the substations.

During 1958, the company plans to install supervisory control, telemetering, communication and high-speed relaying in the El Rancho and Lewis substations. These installations will operate over direct wire to the San Francisco substation, where they will be also tied into the microwave loop. Economy dictates the use of direct wire to these locations because of the short distances involved. The use of direct wire between these substations would also indicate the use of pilot wire relays for line protection between El Rancho, Lewis and San Francisco substations since a pilot wire circuit would be available. A similar system will eventually be installed at the Artesian substation over direct wire to the North Las Vegas substation.

Within a few years it is expected that both the Tonopah and Carey substations will increase in importance to the point where they will be tied into the microwave loop. When this is accomplished, all facilities available in the other loop substations will be available to the Tonopah and Carey substations.

The 138-kv line between Clark steam-electric plant and the Westside substation is switched by means of a 138-kv breaker at Clark and a 69-kv breaker at Westside on the secondary side of the 75-mva autotransformer. Transformer differential relaying will necessitate use of a transfer trip arrangement to affect simultaneous tripping of the breakers at Westside and Clark. This transfer trip circuit is also carried over the microwave channel.

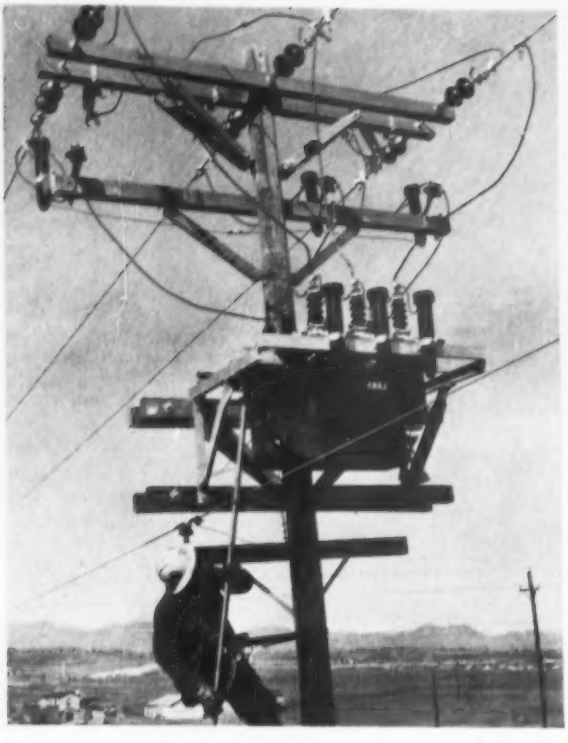
The line take-off towers in a number of substations are being used to mount the microwave antenna dishes. This provides a very rigid tower and support for these dishes, eliminating the problem that is brought about by 60- to 70-mile-per-hour winds frequently experienced in the southern Nevada area. The Clark station microwave room is situated on top of the Clark steam plant and provides a very rigid support for the 8-ft and 6-ft dishes used at that station.

There are no obstructions to the microwave carrier channels between any of the stations and all distances between stations are under 15 miles, so excellent service from the microwave is expected.

Emergency Power and Maintenance

Sixty-cycle a-c power is supplied to the microwave equipment by a flywheel m-g set. This is driven normally by 240-v, three-phase a-c power from the electric plant's or substation's power system. In the event the station power is interrupted, the flywheel will drive the generator and crank up the gasoline engine that is clutch-connected to the m-g set shaft. This will furnish uninterrupted microwave service during a power outage. Sufficient gasoline is available to operate this equipment for 50 hours during such an event.

Dust storms in the southern Nevada area are prevalent and since most of the substations are either in the desert or near the desert a definite maintenance problem had to be faced. One of the most successful methods to combat this problem has been to reverse the exhaust fan, thus placing the control room under positive pressure. The air delivered by the fan is filtered by means of an ordinary spun-glass filter and many maintenance difficulties are expected to be greatly reduced.



Three-phase reclosers are used to protect the main circuit from faults on three-phase branches loaded over 1,000 kw

Three single-phase reclosers are used to protect the main on branches three miles long from 400-kw to 1,000-kw load

PS of Colorado cuts routine engineering of distribution circuits with a . . .

Standard Protection Scheme

J. R. Hayden, J. E. Martin, R. L. Tilson
Public Service Co. of Colorado

A fundamental plan developed by the Public Service Co. of Colorado for the installation of reclosers, sectionalizers and cutouts on 7.6/13.2-kv distribution feeders serving urban areas has these advantages:

—Valuable engineering time is conserved as only the load, length and exposure of a branch line needs to be known to select the proper device from a table.

—Stocking is reduced as only one size each of sectionalizers, single-phase reclosers and three-phase reclosers is used.

—Uniform and consistent protection is achieved.

—The main of a circuit is protected from faults on all its branches.

—Load areas can be switched from feeder to feeder or to other substations without coordination being lost.

—One station feeder breaker relay setting coordinates with either of the reclosers or the sectionalizer.

—The sectionalizer is operated equally well by the station breaker or either of the reclosers.

—Protection remains complete and coordinated when a feeder is divided into two feeders.

—Protecting all laterals means only the feeder main must be patrolled when a fault has locked out the station breaker.

—A branch line can be protected with a sectionalizer until the area builds up and the load and exposure increase to warrant a recloser.

—If reclosers are temporarily removed or by-passed, any sectionalizers normally behind these reclosers will coordinate with the station breaker, thereby offering their normal protection.

This plan is used for protecting 7.6/13.2-kv wye-type distribution feeders, which have been adopted for serving new loads and for relieving overloaded 4.16-kv feeders in the metropolitan Denver area. The basic idea of this plan is to automatically isolate faulted laterals or distribution transformers from the main circuits of these feeders.

Public Service Co. of Colorado designs its 7.6/13.2-kv feeders for loads of 6,000 kw or 7,500 kva. The main circuits, which are of No. 4/0 copper or its aluminum equivalent, can be tied through normally open field switches to adjacent feeders. Distribution in an area is served by laterals tapped to the main circuit. These laterals constitute most of the ex-

A Selected RMEL Paper

Three single-phase sectionalizers are used in lieu of reclosers where branch circuits are less than three miles

Lineman indicates single-phase distributor. Recloser used to protect from faults on several adjacent branch lines

posure to the feeder and are subject to the largest percentage of faults because of their large number, the smaller conductor of which they are constructed, the more hazardous locations in which they must sometimes be built and the number of self-protected transformers they supply.

Complete coordinated protection is achieved through the use of only four basic devices in addition to the station breaker. These devices are:

1. Single-phase sectionalizer rated 15 kv, 140 amp continuous, counting current 220 amp and withstand 4,000 amp symmetrical, set for two counts to lockout.

2. Single-phase recloser rated 15 kv, 100 amp continuous, 200 amp minimum tripping and 4,000 amp symmetrical maximum interrupting, set for two fast and two retarded operations.

3. Three-phase recloser, equipped with ground tripping, rated 15 kv, 185 amp continuous, 370 amp minimum tripping, minimum ground tripping 200 amp and 4,000 amp symmetrical maximum interrupting, set for two fast and two retarded operations.

4. Extra-heavy-duty open cutout rated 15 kv, maximum interrupting rating 10,000 amp asymmetrical.

Coordination

Load limits for reclosers were established so that the minimum trip rating would be 400% of the peak load current to provide sufficient margin for inrush current pickup after the outage. Similarly, the load current limit for sectionalizers was set at 25% of the rated counting current to prevent motor-starting currents and other inrush currents from pulsing out the sectionalizers. Since load limits are set low, it is possible to check and relieve the sectionalizing devices before improper operations occur because of overloads.

The substation relays are all of the overcurrent type with phase relays having extremely inverse time-current characteristics and the ground relays having very inverse characteristics. Both phase and ground relays have instantaneous trip attachments. Coordination of the devices is shown in the accompanying curves.

New branch circuits and extensions are planned to effectively load the sectionalizing devices and to keep the number of taps to the main

Application Standards for Reclosers, Sectionalizers & Cutouts

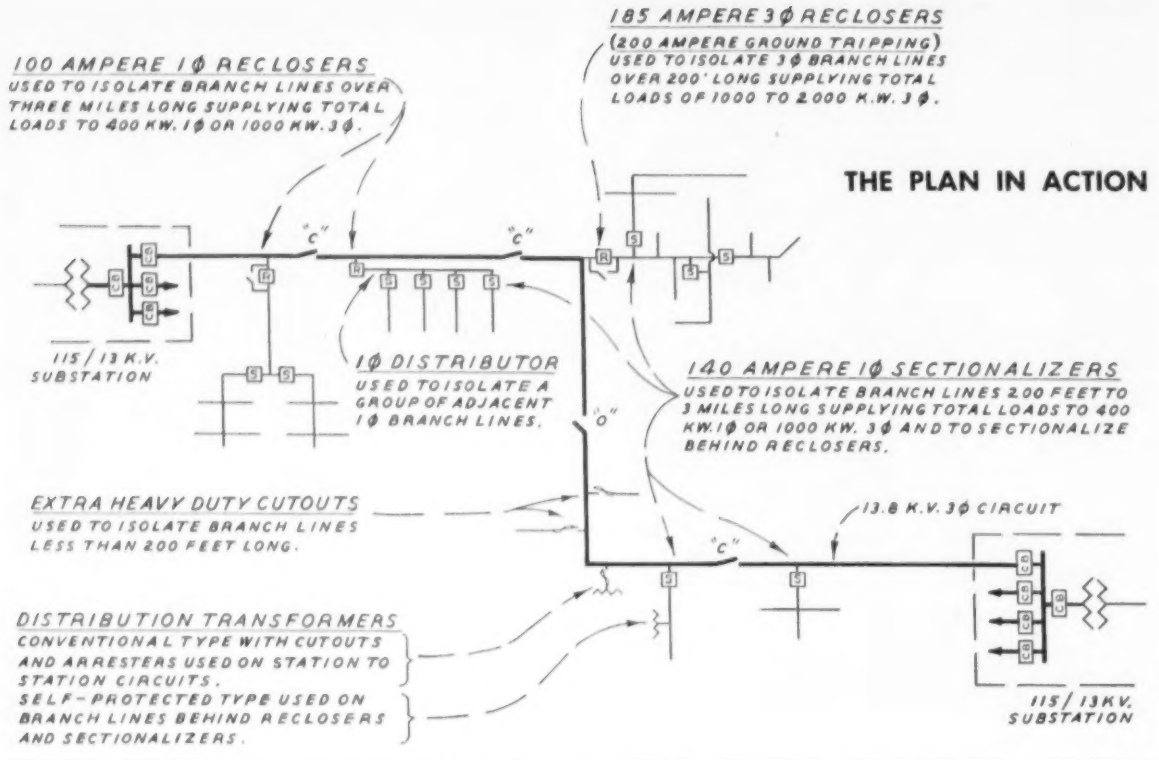
A. Mains
No reclosers or sectionalizers are installed in the main circuit of the feeder.

B. Branch Circuits Tapped to Mains
Devices to be used with branch circuits are determined as follows:

Length of exposure	0-200 ft	200 ft-3 miles		Over 3 miles *
Type of exposure	Normal	Hazardous **	Normal	Hazardous **	Normal
Device if load is 0-400-kw single phase or 0-1,000-kw three phase	Cutout	Sectionalizers		Single-phase reclosers	
1,000-2,000-kw three phase	Cutout	Three-phase recloser		Three-phase recloser	

* Minimum fault current on taps over three miles long should be checked against reclosure minimum tripping current.
** Hazardous exposure includes bad tree conditions, rough terrain, etc.

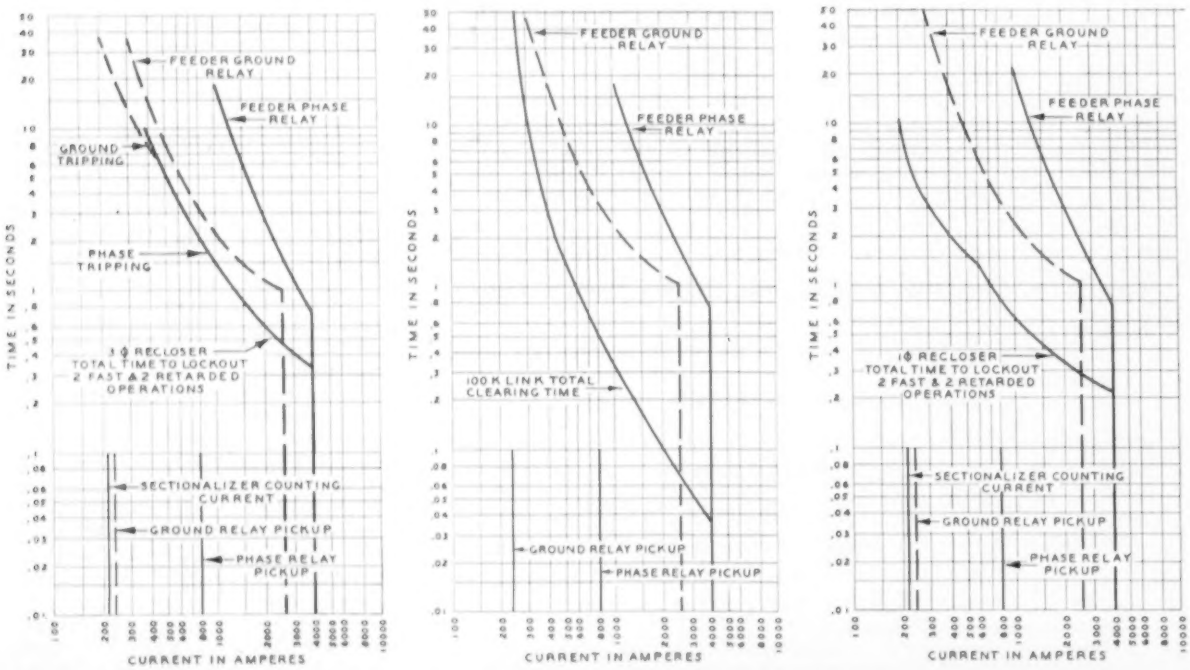
C. Branch Lines Protected by a Recloser
Beyond either a single-phase or three-phase recloser, sectionalizers may be used to further sectionalize the area protected by the recloser.


185 AMPERE 3Φ RECLOSERS
(200 AMPERE GROUND TRIPPING)
USED TO ISOLATE 3Φ BRANCH LINES OVER 200' LONG SUPPLYING TOTAL LOADS OF 1000 TO 2000 K.W. 3Φ.
100 AMPERE 1Φ RECLOSERS
USED TO ISOLATE BRANCH LINES OVER THREE MILES LONG SUPPLYING TOTAL LOADS TO 400 KW. 1Φ OR 1000 KW. 3Φ.
THE PLAN IN ACTION
115/13 K.V. SUBSTATION
1Φ DISTRIBUTOR
USED TO ISOLATE A GROUP OF ADJACENT 1Φ BRANCH LINES.
140 AMPERE 1Φ SECTIONALIZERS
USED TO ISOLATE BRANCH LINES 200 FEET TO 3 MILES LONG SUPPLYING TOTAL LOADS TO 400 KW. 1Φ OR 1000 KW. 3Φ AND TO SECTIONALIZE BEHIND RECLOSERS.
EXTRA HEAVY DUTY CUTOUTS
USED TO ISOLATE BRANCH LINES LESS THAN 200 FEET LONG.
13.8 K.V. 3Φ CIRCUIT
DISTRIBUTION TRANSFORMERS
CONVENTIONAL TYPE WITH CUTOUTS AND ARRESTERS USED ON STATION TO STATION CIRCUITS.
SELF-PROTECTED TYPE USED ON BRANCH LINES BEHIND RECLOSERS AND SECTIONALIZERS.
115/13KV. SUBSTATION

circuits of the feeders to a minimum. Preference is given to feeder patterns which result in taps to the main large enough to justify reclosers rather than smaller taps each protected by sectionalizers. Since reclosers interrupt fault currents independently, while the sectionalizers depend upon the station breaker to interrupt fault current, the use of reclosers to protect taps to the main minimizes annoying interruptions to the entire feeder circuit.

Distributors' Function

In a few subdivided areas the feeder main is so located that it is


FEEDER GROUND RELAY
FEEDER PHASE RELAY
GROUND TRIPPING
PHASE TRIPPING
3Φ RECLOSER TOTAL TIME TO LOCKOUT 2 FAST & 2 RETARDED OPERATIONS
SECTIONALIZER COUNTING CURRENT
GROUND RELAY PICKUP
PHASE RELAY PICKUP
TIME IN SECONDS
CURRENT IN AMPERES
100 K LINK TOTAL CLEARING TIME
1Φ RECLOSER TOTAL TIME TO LOCKOUT 2 FAST & 2 RETARDED OPERATIONS

Coordination curves show time-current relationships of circuit breakers, single- and three-phase reclosers and fuses

tapped with short, single-phase branch circuits in each block. Each of these branch circuits could be protected with a sectionalizer. However to reduce the number of annoying interruptions to the entire feeder, single-phase distributors are used to group several of these short taps together, which are then protected by a recloser. The number of branch circuits supplied by any one distributor depends upon the number it takes to load a recloser and the total number of branch circuits to be supplied by distributors in the area. The distributor is a fourth wire carried on the top crossarm of the pole along with the phase conductors. This position was selected rather than a lower position on the pole to maintain clearances for hotstick maintenance of the line. The distributor is readily recognizable to a lineman as it is a smaller wire than the three-phase conductors of the feeder main. Load is balanced on the feeder by dividing a community into three approximately equal load areas. A separate distributor is then used to supply the branch circuits in each of these individual areas. Connecting these distributors to different phases balances the three-phase load on the feeder.

A large percentage of the outages on the 7.6/13.2-kv distribution system has been the result of arcs started across self-protected transformer bushings by birds and squirrels. To protect the feeder mains from transformer bushing faults, conventional transformer installations utilizing separately mounted arresters and cutouts are used along the mains. Self-protected transformers are used on branch circuits behind automatic sectionalizing devices.

How Has It Worked?

This plan has been followed for the application of reclosers, sectionalizers and cutouts to the Denver system since it was adopted about a year ago. Admittedly, field experience gained in this time is insufficient to permit evaluating the plan as it applies to a utility system that operates for many years. However, the savings in engineering time, record keeping and storekeeping have been so obvious as to warrant considerable enthusiasm. Also field experience so far has been most gratifying because it has indicated that definite and concrete operating benefits have been and will continue to be enjoyed as a result of this plan.

Electric fish barrier herds fish into hopper for truck shipment around the dam

Electric Fish Barrier at Brownlee Dam

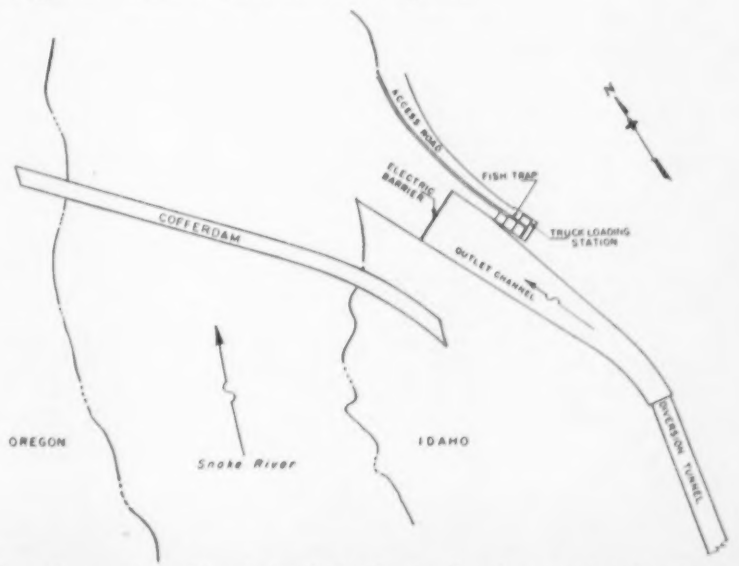
The first large scale electrical barrier for guiding fish has been put into operation on an experimental basis at the Brownlee Dam site on the Snake river.

Leo L. Laythe, regional director of U. S. Fish & Wildlife Service, said an installation was completed last October but proved inadequate for the high water velocities at the site.

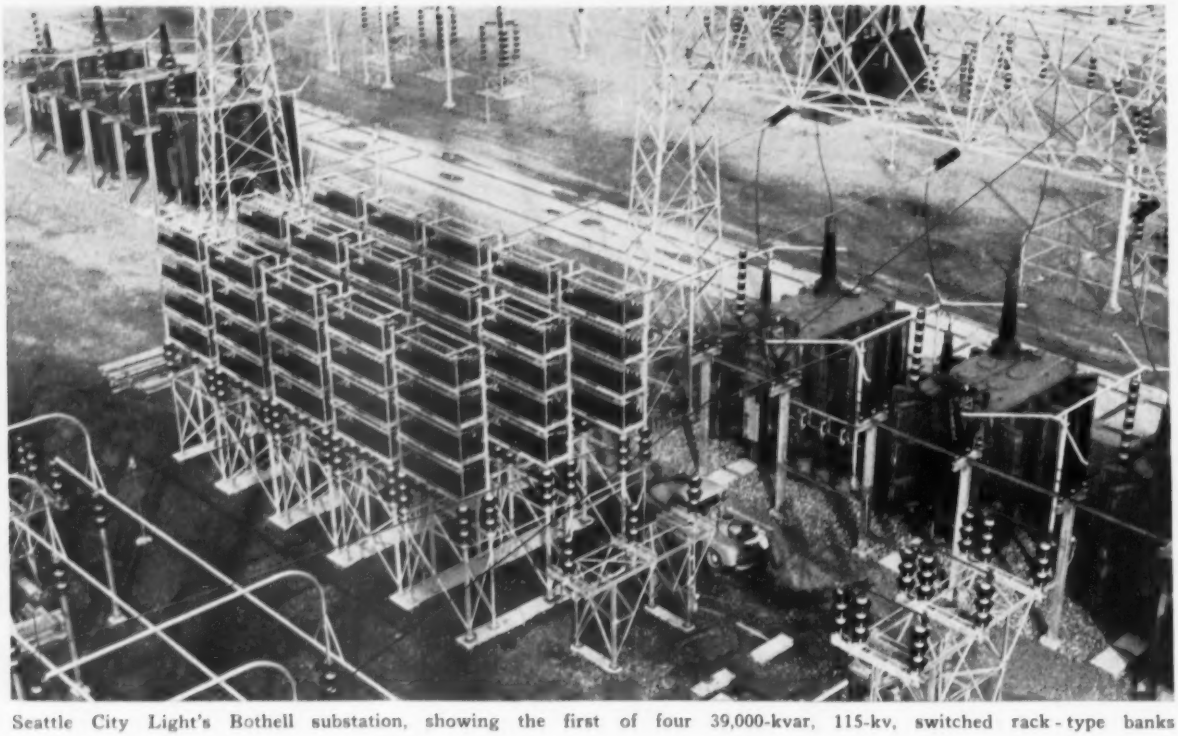
The electrical barrier is expected to guide fish into a trap from which they are transferred to trucks and hauled around the construction site of the Idaho Power Co. which, under terms of its Federal Power Commission license, is providing the funds for the fish installation.

Here's how it works: The fish swimming upstream are attracted by the high water flows coming through the outlet channel of the tunnel which the dam contractors have constructed to divert the Snake River around their construction site. When the fish enters this channel they encounter an electrical field set up by electrodes suspended in the stream and powered by a diesel engine-driven generator. The electrical field diverts the fish into an entry pool. The fish then swim into a brail compartment and, with the aid of a false floor which can be raised or lowered, are urged into a hopper.

The hopper is used to transfer the fish to a tank truck especially designed for the installation. The truck then hauls the fish about a mile and a half above the tunnel inlet, where they are released into the river to continue their upstream migration.



Dam shows relationship of electric barrier to diversion tunnel and main river



Seattle City Light's Bothell substation, showing the first of four 39,000-kvar, 115-kv, switched rack-type banks

Seattle City Light to install switched capacitor bank totaling

156,000 Kvar--The World's Largest

A. W. Moody and **R. L. Skone**
General Electric Co. Seattle Light Co.

A study of the economics of location of reactive supply has led to the installation of what is believed to be the world's largest switched capacitor bank at the Bothell substation on the Seattle City Light system.

Two rack-type banks, totaling 78,000 kva, will be on the line this season. A third and fourth bank will be installed in the future, bringing the total to 156,000 kvar.

The northern half of the City Light system is supplied by four major 115-kv receiving substations. These receiving substations are supplied from Bothell substation, which is a 230/115-kv bulk power and switching station located approximately 20 miles north of the city. Reactive requirements of the system beyond the receiving substation 26-kv buses are supplied by 26-kv and 4-kv capacitors installed on the distribution system.

Economics — An investigation of the most economical location of capacitors to supply the reactive losses of the 115/26-kv transformers, the 115-kv lines and the 230/115-kv transformers showed that approximately 75c per kvar could be spent over and above the cost of 26-kv capacitors, for 115-kv capacitors located at the 230/155-kv substation. In addition, the installed cost of switched capacitors at 115 kv is approximately 45c per kvar less than the installed cost at 26 kv. This is due primarily to the larger capacity that can be switched at 115 kv without encountering excessive voltage change.

The calculated voltage rise caused by switching each 39,000-kvar bank onto the 115-kv bus at Bothell is about 1%. Since there are expected to be only about six such switching operations per day, no trouble is expected from light flicker.

Each capacitor bank is made up of 25-kvar units, each rated 6,640 v. These single bushing units were selected in preference to 50-kvar units because at the time bids were taken the banks made up of 25-kvar units were less expensive than the larger sized capacitors.

Why Grounded Wye? — The grounded wye connection was selected in preference to the double wye because twice as many units in one series group can fail without resulting in overvoltage on the remaining units in that group. The grounding of the neutral results in three additional beneficial effects:

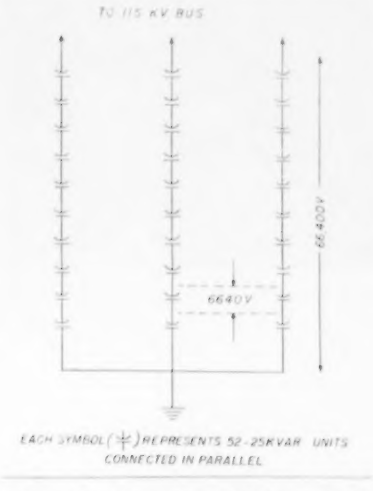
1. Reduces operating duty on circuit breakers.
2. Makes the bank essentially self-protecting against surges.
3. Makes possible inexpensive and more reliable relay protection against major faults in the capacitor bank or structure by means of neutral current relaying.

A study was made of harmonic voltages on the 115-kv bus at Bothell and these were found to be of such low magnitude that excessive harmonic current would not result from neutral grounded. Since this large transmission station is attended, it is not costly to provide daily inspection for blown capacitor fuses.

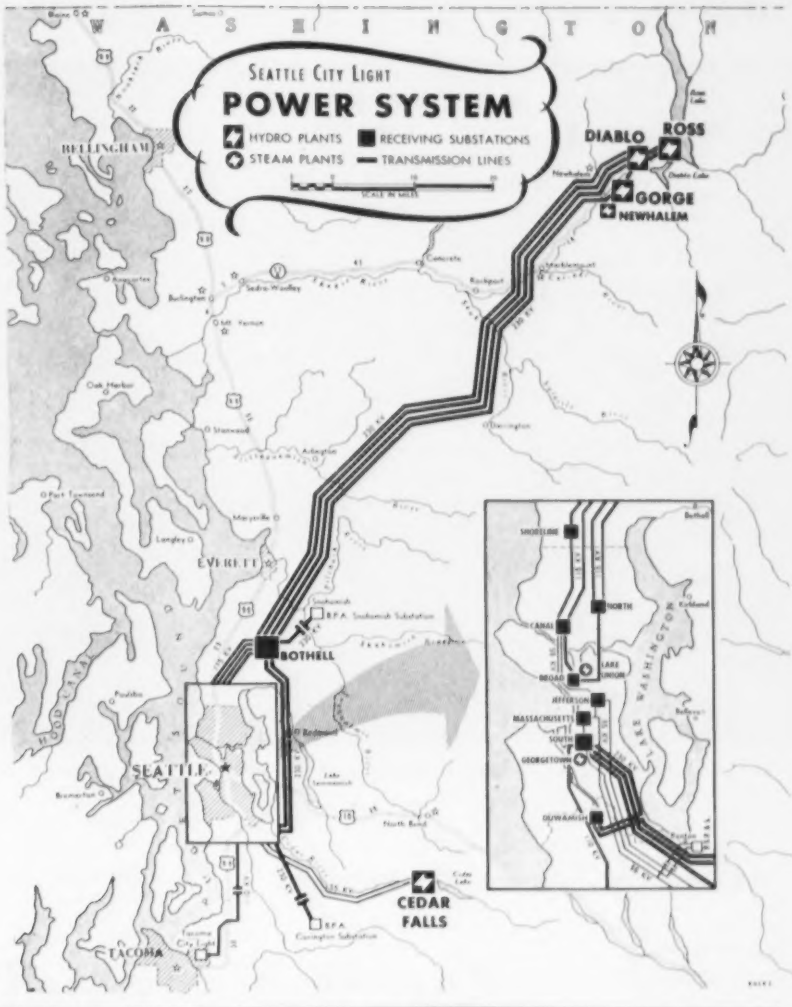
Protection — Differential relay protection is provided around the

115-kv bus to which the capacitor banks are connected. In addition, each capacitor breaker is provided with time overcurrent relays. Good protection of the capacitor bank against failure of more than 10% of the individual capacitor units is obtained by means of sensitive neutral overcurrent relays. These special relays were developed by the city of Seattle engineers.

Manual control of the capacitor switching will be used. It is expected that the kvar flow through the 230/115-kv banks will be used to indicate to the operator that a switching operation is necessary.



Schematic of each 39,000-kvar bank



Utilities Survey For Transmission Plan

Three privately owned Utah utilities have launched a survey which would lead to utilization of energy from Glen Canyon hydroelectric power project just across the border in Arizona.

It is expected the energy would be available within the next 10 years.

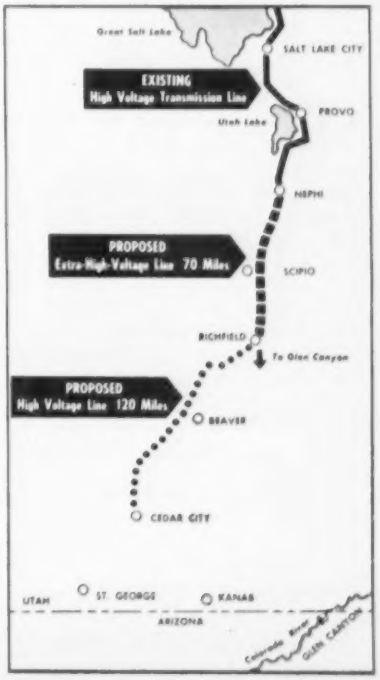
Participating in survey on first leg of the venture are Utah Power & Light Co. and Telluride Power Co. They plan a 230,000-v, 70-mile line between the end of the UP&L. system at Nephi and the Richfield area. Preliminary cost estimates are $1,900,000.

Until Glen Canyon power becomes available the system would operate on 138,000 v, with UP&L. transmitting energy to the Telluride system.

At the same time, officials of Southern Utah Power Co. announced commencement of a survey looking toward construction of a 138,000-v line from Cedar City connecting with the UP&L.—Telluride project at Richfield. This 120-mile line would cost about $2,800,000.

The three utilities explained they were shaping long-range plans to meet the load growth during the next 10 years and also working toward the day when they would be in position to bring Utah's share of Glen Canyon power to their respective service areas.

Should a shorter route directly from Richfield over mountainous and virtually unexplored terrain to the Glen Canyon generating facilities in Arizona be found feasible the energy for Southern Utah Power could be circulated back to the southwest part of the state from the Richfield connection.



Utah utilities proposed 138-kv lines

The plot plan shows the location of only 18 subway cutouts in a tract of 93 homes — key to big underground savings

San Diego G&E installed one transformer per house and . . .

Cut Residential Underground

J. B. Bowen
San Diego Gas & Electric Co.

ABOUT 15 miles north of the San Diego downtown area, a 240-acre site is being developed as a plush residential subdivision to be known as La Jolla Farms Club Estates. The 240 acres have been divided into 93 lots. The price range on these lots runs from $7,000 for the small lots, up to $40,000 for the larger choicer lots—the average price being just under $25,000 per lot. The architectural control is such that it is unlikely that any homes will be built on any of these lots for less than $50,000. This is the other half!

The subdividers preferred that the utilities be placed under ground. In making studies for the electric underground portion of this work, we were guided considerably by our past

A Selected PCEA Paper

Major Electrical Equipment and Cost

	Primary Service Cable	Primary Substructures	Customer Service Cable	Equipment on Customer Property
Plan No. 1 (adopted) 4 kv	**5-kv 3/c PILC in duct**	**Small manhole for fuse cutout for 3-5 service taps**	**5-kv 1 conductor rubber covered in duct**	**1 modified conventional transformer in customer's pad or vault**
Plan No. 2 4 kv	Same	Full Vault 5-kv subway sectionalizer 5-kv subway cutout 5-kv subway transformer	600-v Rubber in ducts	None
Plan No. 3 4 kv	Same	Same as Plan 2	75% like 2 above 25% like 1 above	75% like Plan 2 25% like Plan 1
Plan No. 4 12 kv	15 kv Delta system 3-1/c PILC	Full Vault 15-kv subway sectionalizers 15-kv subway transformers (CP)	600-v in duct	None

experience in a similar underground tract. We had found it necessary in many cases to install a primary service at 2,400 v to individual residences. This was caused by the load increasing so rapidly that it took a transformer of from 10 to 25 kva to serve a single residence. This system was designed to accommodate any load increase that might occur in the next 15 years.

Who Does What

In making studies for various underground systems, the following rules were observed as to the allocation of costs and responsibilities:

1. The tract owner or his contractor is to furnish all material and install all substructures as well as main duct lines in the street. He also is to install all laterals to the property line. The main cable is to be purchased and installed by the tract owner.

2. The owner of each lot is to install the lateral from the property line to any point he may select and there install terminal facilities, which are optional on his part.

(a) A vault, entirely underground;

HV and LV cables enter the HV bushing entrance. Use of standard units saves

(b) A vault or transformer room incorporated in his garage;

(c) A transformer pad above ground (the utility will safely house the transformer);

(d) Pay for excess service cable above what is allowed on a connected-load basis.

3. The utility is to furnish all plans and specifications of material. All splicing, installation of sectionalizing switches, fuse boxes or other protective equipment are to be furnished and installed by the utility. All service cables are to be installed by the utility, as well as the furnishing and setting of all transformers.

The utility will make the necessary financial arrangements with the tract developers toward absorbing a portion of the cost of the underground facilities as the utility would have necessarily made certain expenditures in an equivalent overhead system.

Four types of underground installations were studied, with results as tabulated in the accompanying box.

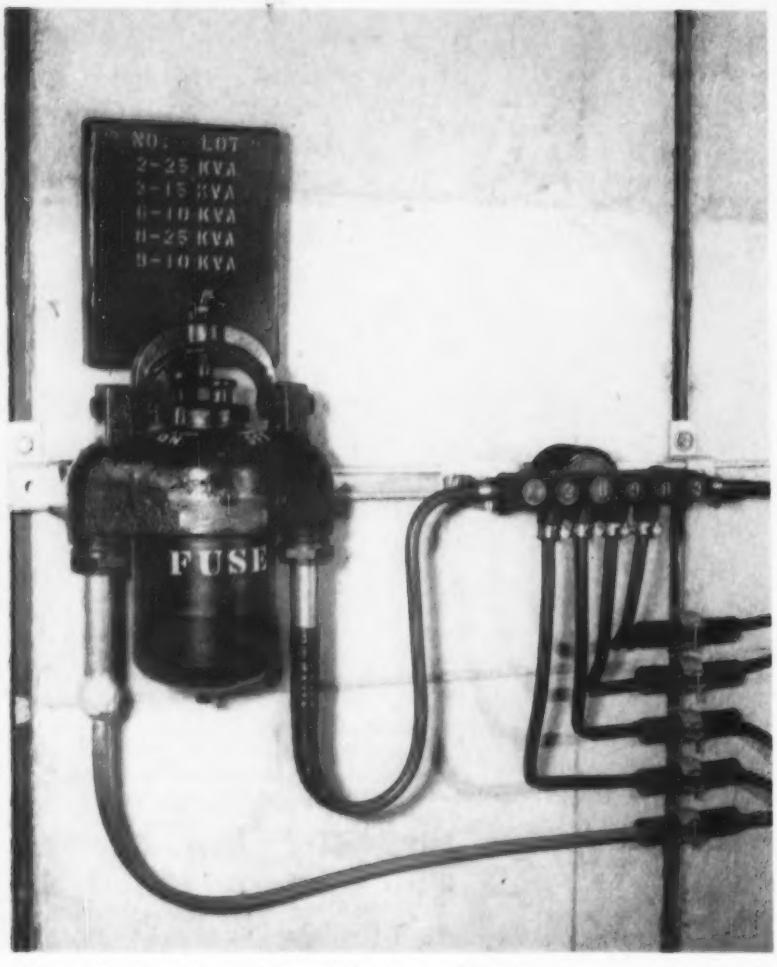
Protection

In planning the protection for this tract installation, it was thought that individual protection for each transformer (serving one customer) was too great an investment. A scheme

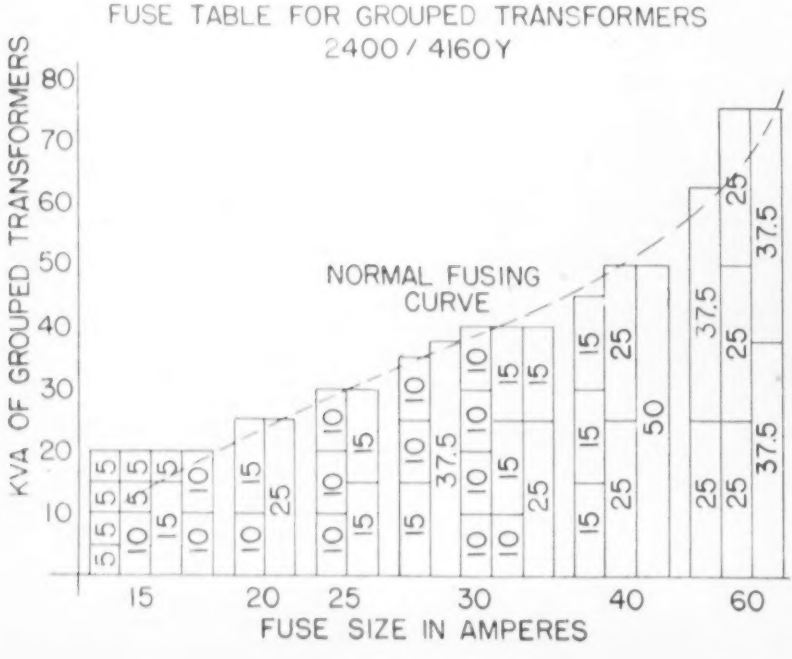
Costs

Comparison of Underground Systems

% Utility Cost	% Developer's Cost	Advantages	Disadvantages
100	**100**	**Minimum regulation or voltage problems Minimum problem in load growth 100% salvage for increased loads Outage minimizes (1 to 5 customers for a service failure)**	**Installed transformer capacity per customer is high, no advantage can be made of diversity factor**
110	130	Conforms to so-called "Standard System" Somewhat higher factor of reliability	Standard high cost underground system Long costly service runs Regulation and voltage problems Problems in load growth Low salvage of services Outage to 6 to 8 customers for a service failure
94	130	Lower utility cost Fair reliability	Confusion to customers and operating personnel Lack of expansion facilities for secondary fed lots
130	140	Good regulation	No adequate protection for 12-kv delta Not economical to establish 12-kv wye system Not adaptable to hot work Low salvage value on secondaries Long costly secondary services Outages of 6 to 8 consumers when one service fails



Above, primary cables are fused and fed to 3 to 5 homes. Below, group fusing table



was therefore worked out where from three to five transformers could be connected to one fuse and still secure reasonable protection. There are limits to this scheme and it will be necessary to select carefully the grouping of these transformers. This was done on the following basis (see chart):

1. The fuse shall clear secondary faults (assuming no fault impedance) with approximate factor of safety of two. Faults are assumed to be 120-v line to neutral at the secondary bushings of the transformer.

2. Allow the transformers to carry a short time overload of about 80-100% for the entire group. This will allow higher load on the individual transformer.

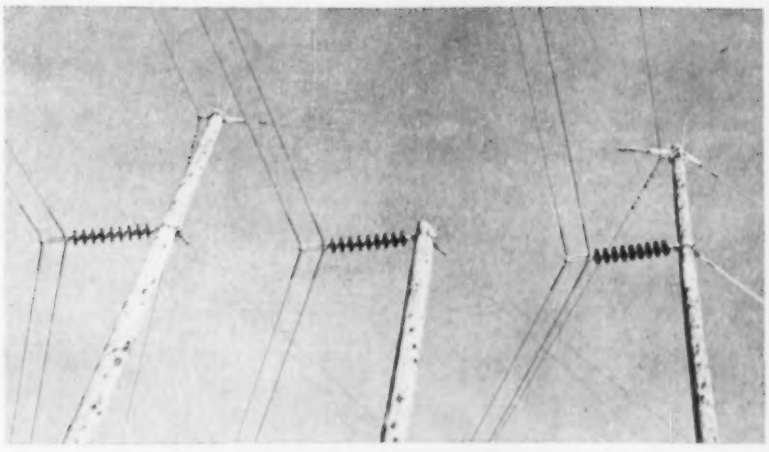
3. No attempt is made to prevent burn out of small transformers from overload by primary fusing.

This method of fusing transformers in small groups, rather than the conventional method, would show a saving to the utility of about $10,500 for the tract.

Consideration was given to the use of a small watertight junction box that could be used as a primary terminal box on the load side of the fuse but here again the cost was relatively high. Use could be made of a low-voltage mole-type terminal strip, insulated from ground by means of a small standoff insulator. Although this would not afford quite the same degree of reliability as a watertight junction, the saving to the utility would amount to approximately $3,000.

It is hoped that the innovations we are trying on this tract will prove successful and that others may contribute more—so that ultimately we can offer the tract developer a reasonably reliable underground system at a reasonable cost.

Close-up of transformer installation



Three pole angle suspension structure shows method of spacing duplex conductors

Hardware close-up after installation

Elephant Butte Line Bolstered

Bureau of Reclamation designers have recently broken a transmission line bottleneck by adding a second 4/0 ACSR conductor to a 115-kv line from Elephant Butte to Socorro. The addition of the second conductor increases the line's capacity to 40 mw.

The new five-party New Mexico power pool pact carried a commitment to reinforce the line this year. Addition of the second conductor will make the line adequate until 1960-62.

A problem that faces duplex conductor designers is that of abrasion of like phase conductors under wind conditions. Specs for this job call for spacers consisting of two 31-in. armor rod sets over which are placed four U-shaped preformed rods. Two rods each way form an oval oblong unit of sufficient flexibility. Maximum separation is 200 ft.

Pictorial Shorts

PGE Designs New Line Truck

A new design to be used for all line trucks has been developed by Portland General Electric Co.

Its features:

1. An auxiliary 2¾-hp motor that powers the radio transmitter and receiver. It uses less fuel than the main engine—fuel bills for radio-equipped trucks have been cut in half.

2. A cab that tips forward for easier access to the engine.

3. A hydraulic boom for setting and pulling power poles. The driver can operate the boom with one lever and can keep his eye on it through a periscope mounted above the cab.

4. A man-cab equipped with fold-down table for eating, water supply, heating and (vent) cooling systems. It has space for four and the driver's compartment seats two more.

5. A compartmented body with spaces to fit each piece of equipment.

6. A roof that slides back and forth, exposing the work deck of the truck. A vice and a winch are mounted on the work deck, the winch being operated by same lever that controls the boom.

7. A vacuum brake used when hauling trailers.

Linemen have their say in the development of PGE's design for new line truck

PGE decided to standardize its line trucks for greater efficiency and economy. The new design was worked out by A. B. Cayo, superintendent of distribution, J. P. Armfield, line department superintendent, and L. F. Rohan, garage superintendent.

Eight of the new 2½-ton vehicles are already in operation. Wentworth & Irwin, Portland, built the bodies.

Walls of glass or metal panels, as in this Eugene building, leave no chance to run conduit or boxes for electrical outlets, so

In Modern Glass Walled Buildings

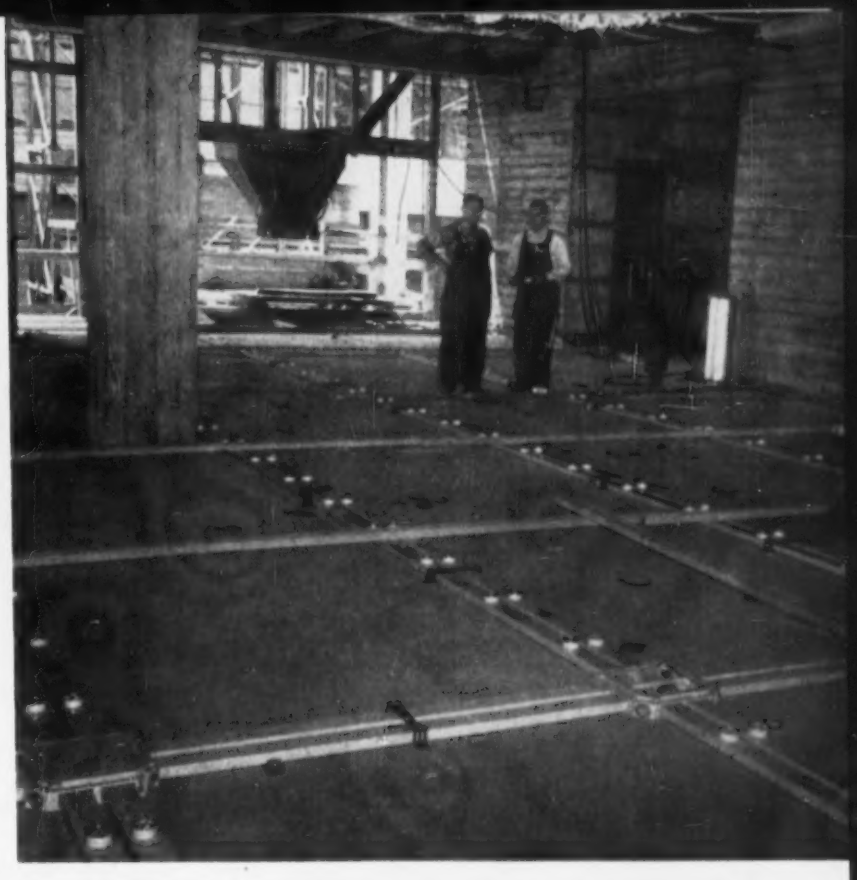
Duct Answers a Problem

Modern architectural design is no respecter of the mechanics of serving the building with modern conveniences. It seems to be more concerned with line than living. But the electrical industry so far has met each "impossibility" with a means to make it possible. A case in point is underfloor duct. Only large buildings used to be considered the place in which to use underfloor duct. Now the small office building with slab floor on the ground or cast in decorative patterns, such as in the United Pacific Insurance building above in Eugene, over an off-street parking area, finds duct about the only way in which electricity can be served for office machines or telephones, said Fritz Klawa, consulting electrical engineer of Portland.

Contractor had underfloor duct in place and conduit home runs to main panel before the concrete floor slab was poured in this small office building

Local ordinance in Eugene now requires every new building to provide off-street parking. A means of doing so is with an L-shaped structure such as that designed by Wilmsen & Endicott, shown above. Floors and roof are cast concrete slabs. Brighter Homes Electric Co. of Eugene, electrical contractor, installed four and a half runs of two-channel Howard duct in the forms for the ground floor and two for the second story at right angles to the ground floor. The main panel is at the rear in a utility room to which the service comes. Lighting is done with parallel rows of fluorescent lamp troffers switched at a panel for each floor. Thus, both lighting and supply for office machines permit the moving of metal partitions to make offices of various sizes as wanted. Five permanent partitioned offices along the side of the main floor have conventional outlets in the walls.

While a duct installation may cost more than conduit or tubing a modern system goes in fast and, what is more important, gives the versatility needed for the changing of furniture and facilities that can not be known originally.



Underfloor duct for 110-v supply to office machines and for telephones makes the moving of modern metal unit partitions possible anywhere on each floor later on

— — where

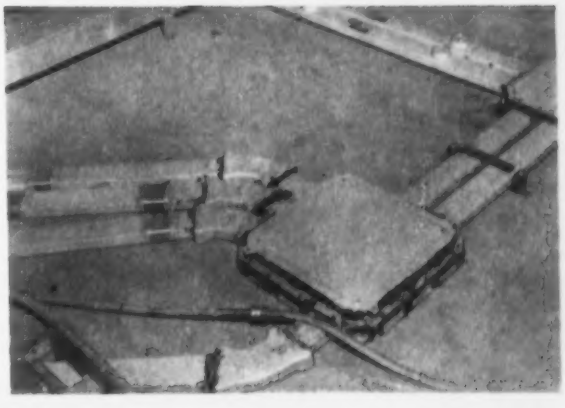
Versatility and Capacity Needed

The same holds true today in big building construction. Exterior walls of prefabricated metal panels with insulation sandwiched in between leave little opportunity for concealment of outlets or switches in walls. Interior partitions are steel or composition assemblies that can be moved for office space rearrangement. Yet the demand for office machine power increases.

Underfloor duct provides for both versatility in arrangement of desks and partitions and for additional raceway capacity for future loads. Inserts on two-foot spacing make either telephone or power outlets available near almost any arrangement of desks or office machines.

On the job illustrated here, the American Fore building in San Francisco, the duct proved of value in another way as well. To speed construction and to make use of floor space on some floors even while others were being poured the first thing erected was the elevator shaft. Use was made of the elevators to handle construction materials. The lower floors were finished and occupied while the upper floors were still being built. Underfloor duct speeded pulling in of circuits and providing outlets as fast as the prefabricated partitions were moved in.

In this instance Charles Farrow, electrical contractor, added some details to improve the installation. To feed some sections remote from the panel, instead of running the conduit in the slab or on it over the duct, a hole was cut in the bottom of a junction box and through the slab below it and the conduit to feed it brought in from below into a bushed fitting. Another idea to make use of short ends was to connect them with a sleeve fitting and waterproof the joints with Scotch tape before the finish concrete pour was made.



Three channel junction box of Howard duct; and angle fittings. Note duct can be pieced by use of taped sleeve fitting thus making use of all material on a job

Hole drilled in bottom of junction box permits bringing feeder conduit to it through floor slab underneath and across furred ceiling of the floor just below

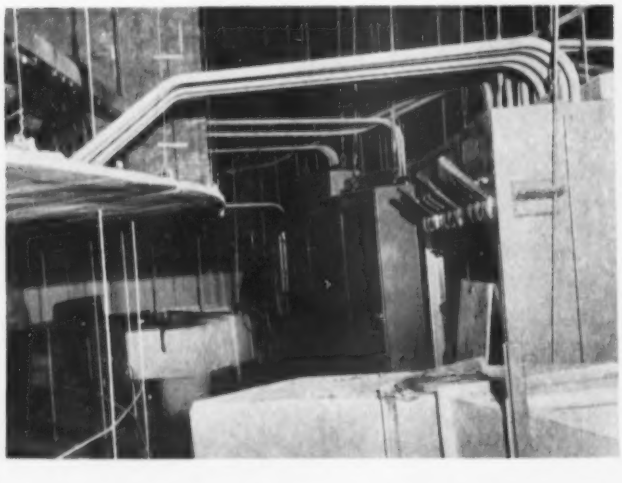
Concrete roof dome was cast on a rounded hill, then earth excavated under it for 256-ft circular arena, seating 6,200 total

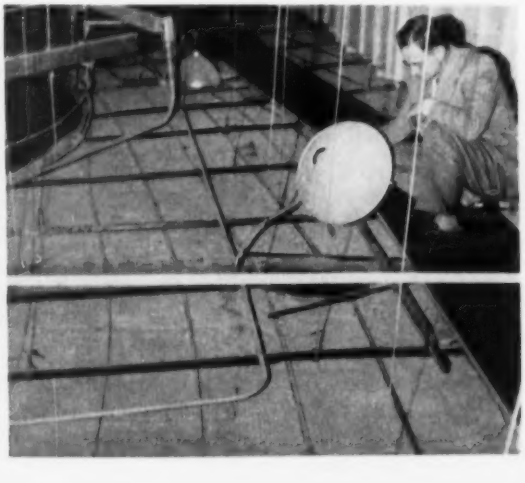
Carl R. Albach, consulting electrical engineer, at compact remote control push-button light panel in manager's office. Pilot lamps indicate areas lighted in the building or on the outside

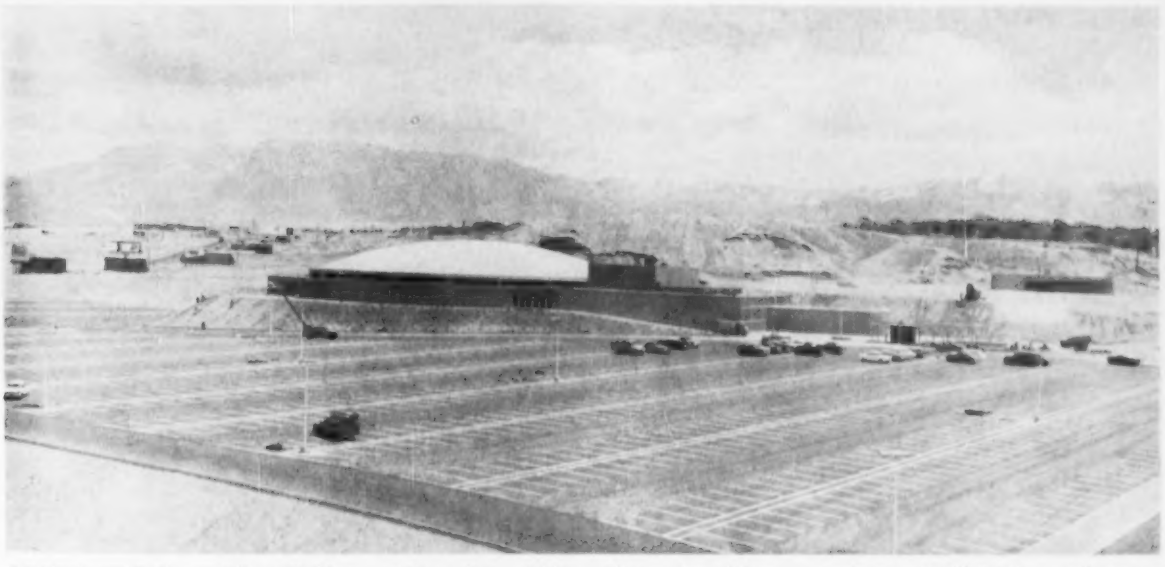
Albuquerque Auditorium works . . .

From the Roof Down

Because it was begun as a thin-shell roof dome cast over a hill that was then excavated from under, Albuquerque Civic Auditorium, designed by Ferguson, Stephenson & Associates, AIA, is unique. To light it Carl Albach, consulting electrical engineer, inserted two rings of 1,500-w incandescent lamps in aluminum reflectors alternately with the air conditioning anemostats in a large acoustical baffle suspended by rods from the cast dome. This permits relamping from catwalks. The baffle ceiling also supports a stage dimmer board, sound equipment, air ducts, etc. (shown below). Large appertures in the baffle permit use of stage spots and floods from there directed down to a stage or sports ring below. These are plugged into stage outlets. Regular auditorium lighting is remotely controlled from several stations. Contactors are located in three panels and at the main substation

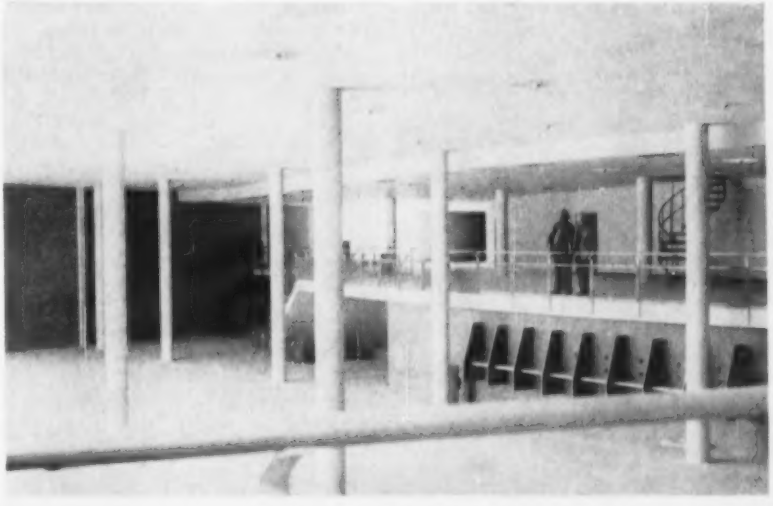


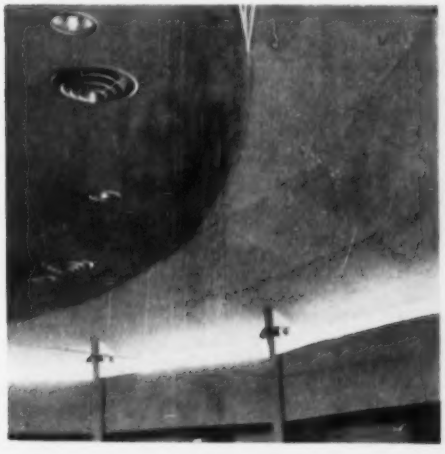




Finished auditorium with encircling corridors, large lobby, office and utility annex, large floodlighted parking area

Main arena (below) with a 142-ft-diameter concrete floor has room for 2,500 temporary seats. Balcony seats 3,700. They occupy the entire area under the 256-ft dome. To light the smooth periphery section of dome near the windows, strips of slimline lamps are concealed behind a parapet. The seated section is flooded by louvered floodlamp units mounted on each column. Main arena is lighted by two circles of 1,500-w lamps. Additional down lighting is directed through large openings in the baffle ceiling. Pipe rails are suspended across the end of arena to hang drapery to enclose a stage. Large entrance lobby (right) and adjacent small theater alcove are lighted with silver bowl louvered flush mounted fixtures. Electrical contractor was Conwell Electric





Outside lighting makes a jewelcase of the building at night for this wholesale jewelry establishment in Salt Lake City

Light Sells Jewelers

The Movitz Co. in Salt Lake City, Utah, saw that its business was in a development phase. Would the present wholesale jewelry trade continue to be the main interest? Would business growth turn the company toward manufacturing? With the questions unanswered, it was decided to plan the new building for either eventuality.

The main floor of the 62x95-ft single-story structure contains offices, general display room, private booths for salesmen and customers, and shipping room. The full basement has a large combination conference and lunchroom, packaging room, production room for promotional material, storage and service space, and a compact heating and air conditioning plant. Perhaps a third of the basement is awaiting assignment.

The electrical layout is striking from its variety, flexibility and harmony.

Floodlights, concealed in the shrubbery, play against the front of the building. Canopy downlights are eyeball units. Gooseneck bracket units light the driveway and rear parking lot. Outside lighting is time-clock controlled.

The receptionist's office and waiting area are lighted by daylight through the plate glass front and by eyeball units recessed in the ceiling. In general, office and shipping room lighting is from recessed fluorescent units grouped in keeping with room dimensions. Pierced cone units are used in the private booths. Downstairs, glass bowl units predominate where visual tasks are light.

The main showroom dimensions are 40x58 ft. Merchandise is displayed in horizontal and vertical glass cases, on counters and tables, and on the front of storage bins and shelves. Buyers are allowed to move about and make selections at will.

The general lighting is supplied by two concentric rectangular bands of 4-ft, 4-tube, instant-start fixtures recessed in the hung ceiling. Adjustable eyeball units, fixed spots, pendant pierced cones and case strip lighting provide accent. Random readings of 100 and 200 f-c were found at counter heights.

In the display room, the incandescent lights are switched in small groups. The tubes in the main fixtures are connected in pairs and each rectangle is halved at the short axis. Low-voltage switching was employed with controls being centered in two 9-unit switch-groups.

In some details the contractor, Oberg Electric Co. of Salt Lake City, perfected the electrical designs as work progressed. For instance, the strip lighting over the packaging room counter was a surface extension after room use was decided upon. On the other hand, supplemental lighting planned for the shipping room was not installed because the general lighting was found satisfactory for all tasks.

Two concentric rectangles of recessed Day-Brite fixtures for general lighting, with recessed eyeball units for sparkle and high intensity on displays

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Tempo rising

Reasonably busy seems to be the state of the electrical contracting business throughout the West. In some places where big jobs are in progress there is a shortage of electrical workers. A few may be on the bench in others, but not the good ones. Vacations haven't begun to thin the ranks...Residential building isn't booming but it is better than new house sales. Modernization for more Housepower is beginning to be felt though where it is promoted.

Who but who

A new twist was given the already mixed-up luminous ceiling field. The sheet metal workers slipped under the jurisdictional tent to claim and be awarded the metal-louvered diffusers in the new Fireman's Fund Building in San Francisco, leaving electricians and carpenters up against the roof. This is making for a new sub-contracting classification—ceilings. Schwartz & Lindheim of Oakland which has pioneered the field has set up such a subsidiary. F. K. Pinney Co. which pioneered from acoustical up did the same. The only glory left an electrical contractor, his name on the billboard in front of a new building, has also been lost in several new jobs.

Inflating

Prices are on the up and up. Although some electrical materials have been reduced slightly, others have climbed. Copper price has sagged but steel will soon go up to meet the new wage scales. Most electrical scales went up in June or July. Even FHA has upped the interest rates on home financing.

Revolt

Separate wage scales for home building will be sought by a group of building contractors in northern California, according to recent press reports. The movement is led by the Santa Clara County Contractors & Builders Assn. and was proposed at a conference attended in Sacramento by 46 counties in northern California. They were quoted saying, "Our goal will be to establish separate scales and working conditions for an industry whose primary objective is to build decent homes that the average wage earner can afford to buy. This year's wage scales have been set primarily by contractors in heavy industry who are in a great measure subsidized by the government." It was charged also that the AGC had sold the construction industry down the river by granting a 90c per hour raise for laborers in five annual 18c installments.

Would reclassify

Another approach to the home building and modernization manpower problem is being proposed by the Intermountain Chapter of NECA. It advocates a classification of "shop journeymen" on regular annual pay roll to specialize, become more efficient and thus sell this market (see story next month).

Delay the big ones

Testing of lighting fixtures for the new high-output fluorescent lamps of the power groove and similar types employing 430-ma ballasts has been moved ahead to begin in July by Underwriters' Laboratories, according to Leonard Hobbs, leader in the RLM and NEMA lighting committees. Lamps not thus tested and approved will be sold without Underwriters' label until tests begin.

Reserve quick

NAED Western regional annual convention comes to Coronado Sept. 8-11 and S. W. Mesick, regional vice-president, and Bill Jewell, manager, advise wasting no time making hotel reservations with them because registration already indicates a sellout of the venerable Hotel del Coronado. ...Jewell conducted the beginning of a second round of area meetings in Portland May 15 for the Northwestern area and one in Seattle June 11, after the national convention. Another was scheduled for San Diego Town & Country Club June 21-22 and for the San Francisco district July 12 at Carmel.

What was done

Of 32 new members of NAED announced at the national convention in Washington May 26, six were in the Western region. They were Howland Electric Wholesale at El Monte, Sunlight Electric Supply, San Diego, Monitor Distributors of Butte, Pavell Electric Supply, Las Vegas, Eoff Electric, Salem, Pole Line Distributing Co. of Salt Lake City...Resolutions concerned cash discounts, keeping of adequate warehouse stocks so that manufacturers would not have to duplicate them and that underfloor duct can be distributed through wholesalers. Opportunities in electric heat were expounded....Lester E. Barrett, past-president, received the 1957 McGraw Award.

Tribute to a champion

S. E. Rockwell, IBEW Local No. 595, fighting business manager, was honored by his local upon completion of his 20th year in the management post. A plaque was presented to him by Otto Reiman, international representative, "for outstanding service" and a watch was given him by the membership. Attending were business managers from the other locals of the San Francisco Bay area, Charles Foehn of No. 6, W. H. Diedericksen of 617, Henry Gunderson, 332, Clarence Feigel, 180, and Ron Weakley of 1245.

The new deal

Wage settlements for a new year pretty much boiled down to the following: In the San Francisco Bay area, the San Francisco, San Mateo, East Bay area plan advanced the scale to $3.52½ per hour with 4% vacation, 10¢ health and welfare, 5¢ joint industry board and 1% pension, which comes to $3.852 per hour. On Dec. 1 it will go to $4.125 and June 1958 to $4.25. The Vallejo-Solano group was expected to follow.

Still in talk

In Los Angeles negotiations were still going on. The scale has been $3.60 per hour without fringes. A demand of 25¢ plus 10¢ health and welfare, 4% paid vacation, seven paid holidays and several other peculiar fringes was being made. San Bernardino was asking 40¢ increase per hour plus fringes; Riverside 50¢ plus fringes.

Decided

In the San Jose area, the Bay area agreement was adopted but the health and welfare was not entered as a separate item. In Fresno, settlement was made in January for $3.50 plus 10% health and welfare and 4% vacation. The joint board was not approved. If approved in the Bay area the contract may be reopened for it. Bakersfield was said to have made a two-year agreement of $3.45 plus 10¢, and to raise to $3.78 plus 12¢ on June 1. In Eureka agreement was reached but was not approved to throw out the vacation and health and welfare, and on a straight three-year agreement take $3.75 July 1, $4 in 1958 and $4.25 in 1959. San Diego was still in negotiation as was the San Rafael-Santa Rosa area.

Mountain echoes

Montana wage scales settled included Helena, a raise of 25¢ to $3 an hour; Missoula, a 25¢ raise to $3.25. Negotiations were still under way in Billings, which had a $3 rate and a 12½c increase was asked. The Lewistown rate is $2.50, with a $2.75 rate for large jobs.

Up north also

In the Northwest, new rates were established as follows: An increase of 10¢ an hour on July 1 to $3.45 for Bremerton and an additional 10¢ in January to $3.55. Tacoma settled for $3.40 plus 14¢ vacation. Seattle was asking a 50¢ increase with a 6% vacation but had not settled. Bellingham went to $2.75 July 1 plus 4% vacation. Shelton's rate was $3.35 and 15¢ more was asked. Aberdeen was asking 15¢. It was getting $3.25 plus 4%. Olympia was asking 8% increase. Spokane increased 12½¢ on July 1 to $3.325 without fringes. The Alaska wage rate went to $4.80, a 20¢ increase, the smallest asked in history.

"Wha-hoppen?"

Washington State Electrical Council met in Richland on June 1 to hold a post mortem on its efforts to get the Washington state electrical law changed at the last legislature. The board of directors meeting was held May 31.

Enlighten on light

A lighting training program was recently concluded for the second time by Arizona Public Service Co. for some 40 architects, engineers, distributor salesmen and electrical contractors. Jerry Whitnell, sales engineer in charge of lighting, says a similar course will be initiated in Flagstaff later and next spring in Yuma. The course consisted of nine weeks of 2½-hour sessions, using the Westinghouse films as a basis with supplementary material from G-E, Sylvania, IES and others. Other special courses given are on air conditioning, commercial refrigeration, commercial water heating. The company developed its own technical course since none was available to fit the local weather conditions. Fred Gabhard and Whitnell prepared it. Although principally for utility men others heard about it and asked to take the course.

Tisn't so

Not toxic. It was erroneously reported in our April issue that the California State Fire Marshal might ban use of acrylic plastics in ceiling diffusers because of toxic fumes encountered in recent fires involving acrylic plastics. The fire marshal replied that he knew of no such adverse experience and contemplated no such action. Manufacturers of acrylic products (Plexiglas and Lucite) state that the U. S. Bureau of Mines has reported that fumes from acrylic plastics are no more toxic than the fumes of wood or paper.

Sorry!

While apologies are in order, one to "Red" Faris of San Leandro, whose firm is known as "Accurate" although he admits to being an Ace himself.

Learn their trade too

Inspectors are holding courses too. Lou LaFehr, chief inspector, Alhambra, and secretary of the Southwestern Section, IAEI, has been holding classes for small-town inspectors who have no other contact with the electrical business. The class is being held at Pasadena City College one night a week for contractors and inspectors in the San Gabriel Valley. He likewise reported that Charles Pierce, chief electrical inspector of Fresno, has had a code course sponsored by the IAEI chapter at Sanger high schools for all inspectors in the small towns and IBEW members. Barney Alverson of San Bernardino County has held similar courses at Valley College for some 80 from the Riverside-San Bernardino area.

Briefing course

Some of the facts of electrical life were being taught to a class of 50 Pacific Gas and Electric Co. sales personnel by the Northern California Chapter, NECA, and local 302 IBEW, Richmond. The class was run June 26 at the Richmond Service Group Center of PG and E with instructors from the union, inspectors and contractors. It will train them to sell more Housepower.

Lease light

A maintained leased lighting plan for offices, stores, factories and public buildings has been announced by T. L. Rosenberg Co., 704 Fourth Ave., Oakland. Leon Hampton, president, inaugurated the new plan, which is arousing interest with chain and department stores, office building owners, banks and public building authorities. Lighting and fixtures of the client's choice are installed and maintained on a long-term-lease basis. The lease expense compares favorably with competitive bid, outright purchase.

Licensed

Smoot-Holman Co. has licensed Fluorescent Fixtures of California to manufacture the Perfect Vision line of luminaires developed by it.

Also active

Pacific Electrical Contractors Assn., Portland, not affiliated with NECA, recently elected Ed Jewett of Ajax Electric Co. as its president, succeeding Dan Schierman of Graham Electric. Roscoe Watts is secretary. This association is sponsoring a course for contractors at Lewis & Clark College, Portland, using many business and professional men in the city as instructors.

No novices at it

Linemen apprentice courses are not new to the Rocky Mountain region. The first was started six years ago in cooperation with the Emily Griffith Opportunity School. Carl Tobiasen of Local 111, Denver, developed the text material. Robert Warden, coordinator of apprenticeship training for the region, is in charge of the course. The correspondence course was developed two years ago.

Home substations

Secondary distribution for homes at 480 v is definitely being planned by Southern Nevada Power Co. at Las Vegas. Studies are being made by Dwight Hoopes, chief engineer, and it may be tried out in a new residential tract soon. With the nation's highest density of electric load among residential customers, because of electric heating in winter and air conditioning in summer, the system would reduce distribution costs about 40%. Equipment such as heat pumps and air conditioning with 480-v motors is being sought. Each residence would probably have a small packaged transformer and meter unit or "substation."

Preview flat TV

Sylvania's Fred A.Wolfe of Salem broke through release barriers to show the Golden Gate Section, IES, a new break-through in lighting devices. He called it the wedding of photoconductive materials and electroluminescent materials in a unit that may be the forerunner of panel-type television screens. Certainly it will have application in the computer field and in displays, etc. By ingenious electrical circuiting and a double sandwich of these materials, light patterns can be created at will and erased immediately. Wolfe also discussed electroluminescence and its present limitations but promising future. Sylvania, by the way, has a new brochure describing applications and characteristics of what it trade names Panelescence.

Crazy business

California's legislature adjourned in June, having passed six bills, mostly tightening up the requirements for licensing in the state contractors license law. One defines an owner as one who owns not less than 15% of the firm and the managing employee must really work there. Advertising that one is a contractor without having a license is made illegal. Another covers insanity. And another bankruptcies.

School for schools

Southern Colorado Chapter, IES, conducted a lighting workshop for school administrators, architects and maintenance men. Bob Even of Southern Colorado Power Co. was chairman of the committee handling the course.

Contractors Go to School for Management

Mel Parker gave a sample at Salt Lake City last year

Instead of figuring down and down to costs the Oregon-Columbia Chapter of National Electrical Contractors Assn. did some addition that brought to light the startling size of the electrical construction market in its area. It is big business. As such if the electrical contractor members of the chapter expect to do that business, the directors felt, then it must be regarded as a business and treated with a respect for its size and responsibility.

This is the basis for the intensive and extensive training program both for management and workers that the chapter has been conducting over the past three years and which it is now expanding to meet the challenge of the opportunity that the market affords.

Contractors are not ones to go to school willingly. Practical men, most of them, some without college education, they have "gotten by" through enterprise and persistence. How then were they brought to appreciate the need for some training in management itself if they were to be successful as businessmen first and, secondly, to command the work that the expanding electrical market in their area offered?

According to Laurence W. Rodgers, chapter manager, there was a highly successful trainer in the functions of management working for some of the large industrials in the region. His name is Mel Parker. Through cooperation with the Oregon Department of Vocational Education the chapter was able to obtain him as an instructor and director.

The first step was to give all members of the chapter a preliminary test on the "96 Functions of Management." (This was explained at the NECA regional conference last year at Salt Lake City by Mr. Parker.) Through this chart which lists the functions of management and becomes a means of self-evaluation, the members were thus able to check their own abilities against the standards which other industries had found necessary.

The contractors were faithful in their attendance at all of the sessions and found the test to be very revealing. It showed the particular phases of management responsibility in which they were strong or weak. Thus the way was pointed toward training courses to improve their performance and, hence, success in managing their own businesses.

Second step was a course in conference leadership techniques. It was recognized that the conference method of teaching is the best for adults with experience. It functions as a means of pooling the information of all who participate in the group and learning by segregating from that pool the most important things to be learned. Likewise, such a course was necessary in order that the contractors could carry on a training program of their own with their own people or aid the chapter in its educational activity.

For this much of the technique of the wartime job training courses was used. The way to solve problems by the conference method was likewise developed. Two such courses on conference leadership have been conducted.

Next came a six-week management course. In this 25 contractors participated to learn the principles of good management. Since then two more such courses have been conducted and the course is being taken to the divisions of the chapter for smaller groups of contractors. Dave Steinacher, a young graduate of University of Chicago with experience in industrial relations training, joined the staff of the chapter to carry on the educational program and take it into the divisions. He organizes classes which Parker then teaches.

Following this a supervisory training course was prepared for foremen and superintendents. In all, some 100 foremen and superintendents have gone through this course now. It is a continuing operation for new classes as the need arises.

As part of this course a six-hour battery of four tests using the Purdue electrical test for aptitudes, personality tests and other similar screening tests is given each person. Many of the contractors themselves took these tests to learn their own needs for increased efficiency along certain lines. The testing procedure is continued likewise as a service that is available to all members for the evaluation of employees prior to promotion to jobs of greater responsibility. Findings in such tests are held confidential and are likewise used as a basis for counseling.

"We are not training just for training's sake," says Rodgers. "We have a hard-boiled business motive in mind. We are training contractors to be better and more successful businessmen. If this training doesn't do that it isn't worth even trying. However, we feel confident that it will pay off in improved efficiency of management and better business practices."

The program that has grown naturally out of this preliminary training has developed an appreciation of the value of market surveys. The chapter is going in much more for such market surveys. It will use them as a guide to the development of business by members where business is to be found. It is the plan of the chapter to conduct these surveys by the chapter itself. These will include residential wiring surveys, electric heating surveys, lighting surveys, etc.

Chapter functions will then go on

into what are called special activities. Rodgers lists these somewhat in this order:

1. *Overhaul management.* The self-education program to make contractors more efficient and more sales-minded.

2. *Public relations.* This will include a public relations training program to the journeymen themselves and encompass their appearance, cleanliness, attitude toward the public and will likewise give them a small amount of estimating to fit them to quote rough estimates.

3. *Better scheduling.* The need to schedule material, work and methods to get a full week's work through better planning of the preliminaries.

4. *Equipment.* To develop an appreciation of proper tools and equipment for the job; clean trucks well equipped, so that they may go to the job and have what is needed on hand without lost motion.

5. *Uniform billing system.* It is highly desirable to have a uniform billing system that can be announced to the public frankly so that they will know what to expect to pay for different kinds of work. This is similar to the type of thing done in the automobile repair business.

6. *Build prestige into the guarantee* to make it worth having. Contractors normally guarantee their work for a year. The idea is to make the public conscious of it and to make that a valuable asset.

7. *A program of advertising.* It is thought that the first phase of this will be slanted to the housewife to give her an appreciation of the need not only for adequate wiring but good workmanship and a responsible qualified contractor to install it.

With this business-like approach the Oregon-Columbia Chapter hopes to equip its members to meet the challenge of the huge market lying in front of it. It seeks to give the rest of the industry confidence in the contractors' association as an effective sales organization for its selling task.

The chapter has already put some of the program to good effect in an electric heating campaign conducted by the contractors themselves in the Bend area of Oregon. A similar drive for electric heating is being contemplated in other parts or divisions of the chapter (this will be described in a future issue). On apprenticeship training of both inside and line apprentices the chapter has one of the best records in the nation. It wants to make its members the best salesmen and the best business managers in the field.

Doug Ellis coordinates the . . .

Line Apprentice Course Starting

Rolling at last, two classes for apprentice linemen have been started in Portland and Seattle under Director Douglas G. Ellis, who has been employed by the Joint Apprenticeship and Training Committee of the Northwest Line Construction Industry.

The start of these courses culminates the surprising amount of organization detail necessary and the completion and printing of a "course of related study for outside electrical construction apprentices."

The course is sponsored by the committee, which bring together the Northwest Line Constructors Chapter of NECA and four local unions —No. 77 in Seattle, 483 Tacoma, 125 Portland and 659 Medford—and the State of Oregon Department of Vocational Education. The first two classes, drawn from interviewing all potential applicants from the Seattle and Portland locals, almost a hundred in number, began in June in both Portland and Seattle. Later it is hoped to start a course in Spokane and Kennewick and still later in the Eugene or Medford area. An effort will be made to coordinate it with where the line work load is concentrated.

Support of the program is by an assessment of one-half of 1% of labor pay roll on line work, made on all contractors doing this type of work.

Instructors will be linemen selected by the committee. "It is easier to teach a lineman to teach than to teach a teacher to teach linemen," says Doug Ellis, who has served six years on the Oregon State Apprenticeship Council as field representative and assistant director. He also served as business representative for locals 48 and 49, IBEW, Portland, and has had experience as a contractor and service shop manager.

The area covered by the committee includes eight northern counties of Idaho, two northern counties of California and all of Oregon and Washington. Cooperation of the state divisions of vocational education has been obtained from all of the states involved. They provide classrooms for the instruction and assist in training the instructors. The classes in Portland are held at the Portland Apprentice School on alternate Saturdays so that men may come in from some distance. Later, correspondence courses are to be offered.

The text and training course itself has been developed as the result of the work of a task committee set up three years ago by the National Joint Apprenticeship Committee of which Bill Damon is the director in Washington, D. C. The task committee was set up in Oregon because of the record of apprenticeship training in that state and was turned over to Larry Rodgers, manager of the Northwest Line Constructors Chapter, to shepherd through the long process of preparing the course. It was edited by M. O. Valentine in consultation with local and national industry people and under the supervision of Don Gillies, coordinator for the Oregon Department of Vocational Education. The work of other apprenticeship courses throughout the nation, particularly in Wyoming, Colorado and Kansas, was integrated into the course.

The content of the course includes nine major units. The official text is the *Lineman's Handbook* by E. B. Kurtz, published by McGraw-Hill Book Co., the 1955 edition.

Later practice with hot work will be arranged at utility pole yards or local union yards where they have installed facilities. Procedure is standardized in order to make the training uniform in all areas throughout the United States. This is to enable apprentices, who may be moved from one job to another area, to take along with them their folder and be credited for the work that they have already covered. It is intended to indenture all of the apprentices to the main joint committee and then they can be moved from one jurisdiction to another. Master records will be kept in the office in Portland. Forms have been developed to record and evaluate the progress and to list previous experience and background. The office is at 1432 S. W. Sixth Ave., Portland 1.

A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

Can We Afford a $71.8 Billion Budget?

THE BUDGET submitted to Congress by President Eisenhower for the year beginning July 1 proposes federal spending of $71.8 billion. In only four years, three during World War II and one during the Korean War, has the government spent more. Under the proposed budget the government expects to collect $73.6 billion, mostly through individual and corporation income taxes.†

The principal reason for the size of the budget and for this year's increase is an expanding defense program. About 60% of all budget expenditures in the coming fiscal year will be for national security programs. Moreover, this area accounts for about 90% of the proposed increase in federal spending. In addition, as the chart shows, there are large expenditures proposed for purposes other than defense.

Continued budgets of this size, some contend, will lead to inflation and wreck our economy. It has been suggested that they might lead to "a depression that will curl your hair." Yet many insist that the budget, large as it is, still is inadequate in many respects — for defense, schools, agriculture, small business, health, research, indeed, for almost every activity in which the government has become involved.

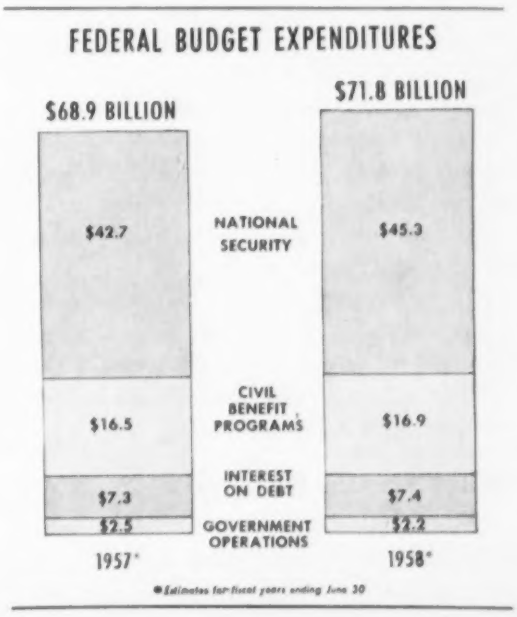
Is It Really Too Big?

Actually, the proposed budget would place no greater burden on the economy than any budget in the last six years, because our economy has been growing. Federal spending per capita under the proposed budget will be about $416, or $10 more than this year; but our per capita income rose almost $80 last year. And, because of our increasing population, next year's expenditures will, in fact, amount to *less* per capita than in 1954 when federal spending was $4 billion lower.

Another way of measuring the burden of government expenditures on the economy is to compare the purchases of goods and services of all branches of government — federal, state and local — with the total output of the nation. The share of our national product taken by government this year will be about the same as in the past two years and, furthermore, about the same as the average for the past 28 years.

By the standard of any recent year, the budget is within the means of the American economy. In this sense, we can "afford" it. But the pros-

†*These figures refer to the regular federal budget and do not include operations of trust funds, primarily for social security programs and the new federal aid program for highways, which are financed by special taxes.*



pect of steadily increasing budgets, requiring 20% or more of our national income, introduces another threat.

The Real Threat

Large and rising budgets that do not balance government spending with higher tax collections clearly would be inflationary and would destroy the value of the savings and income of all who lagged in the race with climbing prices. But serious dangers will still exist even if our budget continues to be balanced, as this year's is.

- **Budgets that require a large take in taxes eat up the savings required to finance private industry.** What the taxpayers must give the government they cannot save. This deprives private industry of the savings and resources needed to expand and modernize producing facilities.
- **High tax rates also undermine the incentive to save and invest in normal business enterprises by taking such a large share of any income gained.** Taxes on corporation income now take 52% of all income over $25,000. And taxes on individual incomes can take as much as 90% of earnings that remain after this 52% bite.
- **High taxes encourage, on the part of both individuals and corporations, the search for "gimmicks" and special treatment.** As a leading character in Cameron Hawley's novel *Executive Suite* observed: "To a far greater degree than most people realize, income tax has become a primary governing factor in corporation management." Indeed, it is only because of the numerous gimmicks and special provisions now available that high tax rates have not already inflicted greater damage to economic incentives.

These dangers comprise the real threat of large and rising federal budgets. It is a threat to continued growth of our economy, and it is no less a threat merely because the budget is technically in balance.

What Should Be Done?

In attempting to hold government spending within reasonable bounds, we should *not* hold back on needed civilian programs. The heavy demands now being urged at all levels of government for roads and schools, for instance, are largely the result of failure to keep pace with the growth of the country. Furthermore, we cannot cut provisions for national security below the minimum level of safety. And unhappily, defense in the rocket and missile age is fantastically and ever increasingly expensive.

What we *can* do is enforce some financial discipline on our military leaders, and hold down our defense expenditures by making sure their demands are justified and by requiring efficiency. In the civilian programs, though some need to be increased to serve a growing economy, we can eliminate the outright waste.

A More Difficult Job

We must also do something far more difficult, and that is to reduce federal programs of aid to special groups at the expense of all the taxpayers. The new budget calls for over $5 billion for veterans, and another $5 billion for farmers. A number of industries and areas stand to receive aid in large amounts based less on necessity than on political pressure. These demands for increased aid, year after year, must be resisted if we are to have any hope of stopping a relentless rise in our budget.

Then, as our national income increases, we can look forward to reducing tax rates and providing greater incentives for the private sector of the economy. **Only in this way — by keeping government spending in line with economic growth — can we prevent our federal budget from being a crippling burden.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

HOME BUILDING IN DALLAS BOOMS RESIDENTIAL LOAD

DISTRIBUTION TRENDS REPORT:

Dallas Power & Light meets challenge of air conditioning load growth

In the last ten years the City of Dallas has extended its city limits to encompass more than two and one-half times its previous area. And, according to forecasters, by 1960 Dallas will require seven times the electric power used a decade ago. In line with this trend, Dallas Power & Light Company's generating capacity rose from 118,000 kw in 1946 to 837,000 kw today, and will increase to 1,137,000 kw by 1960.

These few facts point up a spectacular load growth. The rapid increase of air conditioning load has added to the problem created by the extreme pace of this growth. Dallas P&L was faced with a rising cost of installing a kilowatt of distribution system capacity. This posed a problem for DP&L distribution planners.

MORE POWER TO AMERICA

GENERAL ELECTRIC

Here's how General Electric helped DP&L meet this challenge

DISTRIBUTION TRENDS REPORT:

Sound planning, move to 138 kv transmission, use of capacitors, and flexible substations enable DP&L to meet growth economically

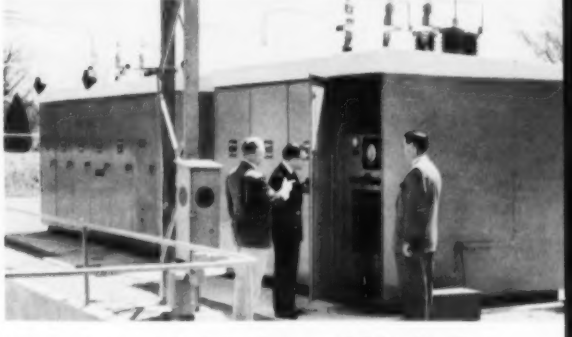
EFFICIENT CLUSTER MOUNTING of 24 G-E 25-kvar capacitors allows more capacitors on pole, contributes to DP&L's high ratio of kvars/kilowatts. Discussing capacitor performance are L. H. Cardwell, DP&L Operating Division Head and G-E Sales Engineer, B. T. Bain.

Dallas Power & Light first implemented a plan in 1937 that treated transmission and distribution integrally, allowing great flexibility for future growth. In recent years the problems of increasing seasonal load and higher construction and operation costs have added new importance to their transmission-distribution practices. Sound planning has enabled DP&L to minimize capital expenditures and operating costs while cultivating loads to improve load factor.

HOW THE PLAN WORKS:

Long Range Planning — Plans are projected in 10 to 15 year periods. DP&L considers generation, transmission and substation facilities for serving a load of three to four times that currently served. Actual load growth and other considerations require that long-range plans be reviewed periodically and revised to fit changing conditions. Flexibility and expansibility underlie all of Dallas Power & Light's programs to stay ahead of rising load.

HIGHER TRANSMISSION VOLTAGE — A large section of the 69 kv transmission ring encircling Dallas is now being converted to the more economical 138 kv. As new generating capacity and load require, the higher voltage will be used on the entire ring. Distribution voltage, except in the City's heart, has long been standardized at 13 kv, and a 13 kv overhead system now serves 93% of the service area.



FLEXIBILITY to meet load growth is provided by this all-General Electric substation, rated 25,000 kva, recently installed by DP&L. Examining it are (l.) DP&L's F. J. Zak, Senior Engr., and (r.) J. P. Barron, Div. Head, Substation and Transmission Engineering and G.E.'s B. T. Bain.

METER ACCURACY is essential to operating revenue. These General Electric single-phase, type I-55 watthour meters are factory certified for accuracy. V. P. Armour (r.), Meter Div. Head, and M. B. Donegan, Supvr. Meter Laboratory, both of DP&L, inspect an apartment house installation.

MORE KVARS — DP&L was one of the first utilities to recognize the importance of capacitors, and now the system has 356,000 kvar of capacitors or more than 0.5 kvar per kilowatt of demand. This is a much higher than average ratio of kvars to kilowatts, and DP&L relies heavily on General Electric capacitors for this favorable ratio. Other General Electric equipment employed includes distribution transformers, regulators, meters, lightning arresters, and streetlighting luminaires.

FLEXIBLE SUBSTATIONS — A basic substation is utilized and includes four 13-kv feeders, each with a normal capacity of 6250 kva. The station design allows expansion to an eight-feeder, 50,000-kva station. This has been adopted by DP&L planners as a basic building block for their distribution system over a wide range of load densities. General Electric engineers helped determine the substation relaying schemes.

When You Specify General Electric, you take advantage of the latest advances in apparatus design, construction, application, and the assistance of complete engineering services. To help utilities keep service running smoothly, highly trained General Electric service engineers plus a network of Service Shops stand ready to meet any and all maintenance and repair needs — day and night.

For Full Information on distribution equipment and Distribution System Services, contact your local General Electric Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y.

LANDSCAPED SUBSTATION is good public relations. L. to r., DP&L's J. P. Barron, Div. Head, Substation and Transmission, and R. D. Elliott, Vice President and Consulting Engineer, discuss new substation layout with G.E.'s District Mgr. — Application Engineering, G. N. Pingree, and DP&L Chief Engr., E. W. Rogers.

NEW STREETLIGHTING for Dallas' Municipal Auditorium is provided by General Electric Form 406 fluorescent luminaires. Standing before the building (under construction) are J. W. Monk, Supervisor of Public Utilities, City of Dallas, and T. C. Winter, Asst. Commercial Manager, Dallas Power & Light Company.

MORE POWER TO AMERICA

GENERAL ELECTRIC

Here's why it pays to see General Electric about your distribution problems

DISTRIBUTION TRENDS REPORT:

Dallas P&L to help test experimental General Electric distribution transformers

Dallas Power & Light Company is one of several utilities that have recently agreed to install General Electric experimental distribution transformers. Through its willingness to try new designs and participate in co-operative testing, DP&L places itself in the ranks of utilities taking advantage of the most advanced designs originating with General Electric product development.

These new transformers represent a highly significant step forward toward reducing maintenance and increasing transformer life. They use molded transformer covers and molded transformer bushings. The molding material is an outgrowth of General Electric's development of molding materials resistant to arc tracking, first introduced by General Electric in the late nineteen forties for instrument transformers. Use of the new cover should reduce outages caused by squirrels and birds and, as it needs no painting, should keep factory-fresh indefinitely. This typifies the manner in which product development at General Electric strives to anticipate and meet tomorrow's operating needs — today.

When you specify General Electric, you get the result of General Electric Distribution System Services which include headquarters system planners — district application engineers and product specialists — extensive product development facilities — equipment installation and field service engineering.

These services offer assurance of maximum operating continuity, on-the-spot application help, equipment efficiencies, valuable help in system design and techniques.
Get the full story from your General Electric Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y.

303-6

LIVE BETTER ELECTRICALLY

LONGER LIFE and a reduction in costly service trips are expected to be proven by DP&L—G.E. tests on General Electric's new experimental distribution transformers. Here, Distribution Transformer Dept.'s M. Broverman, Mgr. Design Engineering (l.) and W. A. McMorris, Mgr. Advanced Product Engineering examine molded parts.

MORE POWER TO AMERICA

GENERAL ELECTRIC

It's Another World . . .

one in which the forces of nature are extremely rough on man-made things. Thus, the simple fact that Simplex supplies more submarine cable than all other manufacturers combined speaks volumes as to product quality. Simplex Submarine Cables are specifically engineered for reliable underwater communication and power transmission. Their many varieties of outer coverings, wire armor, heavy jackets of Neoprene and other materials, guard against underwater hazards and assure long, dependable service.

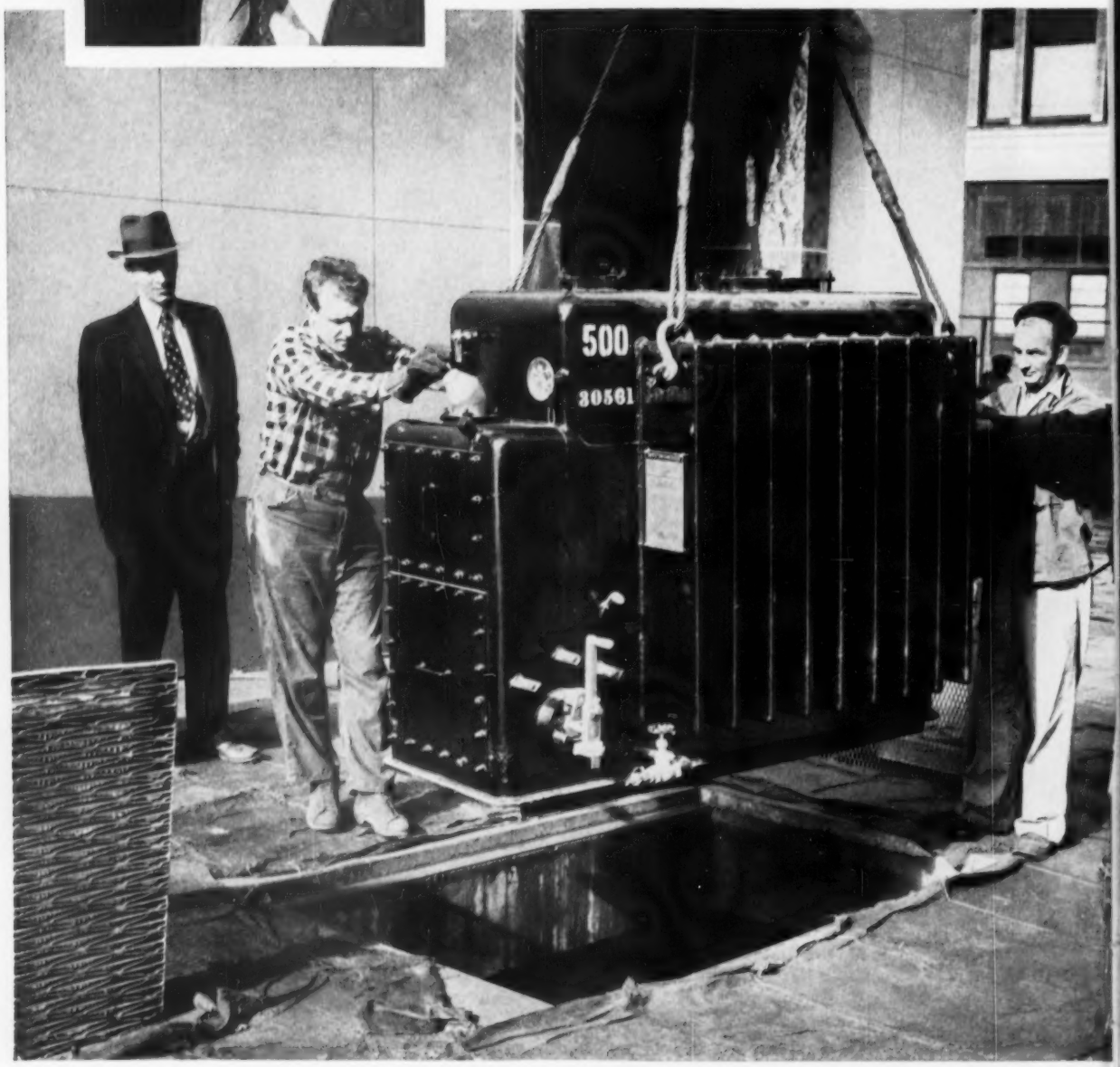
SIMPLEX WIRE & CABLE CO.,
79 Sidney Street,
Cambridge 39, Mass.

Photo of Transoceanic Telephone Cable, Cut Back to Show Construction

LIVE BETTER ELECTRICALLY

Simplex

"The new Space-Miser is a big forward step in transformer design," says Mr. Howard A. Brown, Superintendent of Electrical Distribution for the Rochester Gas & Electric Corporation. "The new, smooth surfaces eliminate moisture-trapping areas. This reduces corrosion and lowers maintenance costs. When we have to refinish a transformer, the Space-Miser design helps us to do a better job, faster, because all surfaces are easily reached."



"New, streamlined Space-Miser cuts maintenance...

transformer corrosion in network installations reduced, even during city's ice-control program,"

says Rochester Gas & Electric Corporation

Each year, the fight of many cities against winter ice and snow creates big problems for the network. Salt and chemicals, the city's weapons against the hazards of winter, mix with snow and ice to form corrosive slush.

Network transformers—though hidden from sight in subway installations—are highly vulnerable. In addition to normal weather moisture, slush from streets and sidewalks runs into these vaults. Westinghouse Space-Miser network transformers are especially designed to shed corrosive debris and provide many other new advantages.

LESS MAINTENANCE TIME, COST—New, smooth contour tank design with Yukon Coolers eliminates sharp edges and debris- or water-collecting areas. Streamlined design makes cleaning easier, repainting simpler.

PROTECTION AGAINST PARTIAL VAULT FILL-UP—Space-Miser design reduces height 12 inches, allows off-the-floor, I-beam installation to keep transformer out of debris.

LOWER INSTALLATION COSTS—New design reduces weight and volume by 20%, permits faster, easier installation, safer handling.

EASY ACCESS TO HIGH-VOLTAGE TERMINAL CHAMBER—Lowered switch and terminal compartment makes sharp cable bends unnecessary. Extra four-inch width in chamber simplifies forming and connecting high-voltage cable.

For the complete Space-Miser story call your Westinghouse sales engineer . . . or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70813

YOU CAN BE **SURE**...IF IT'S

Westinghouse

Mr. Leon G. Atkinson, Assistant Superintendent, Line Maintenance Department, Rochester Gas & Electric Corporation, supervises installation of new Westinghouse Space-Miser network transformer.

IES President Waterman addressed the evening dinner after day devoted to—

Light for All Outdoors

By combining the attendance of experts at a national committee meeting of the Illuminating Engineering Society progress committee, Hugh McCulloch arranged with the Rocky Mountain Electrical League to have the April 24 chapter meeting of the Rocky Mountain Section follow the RMEL conference. The program was based on various phases of outdoor lighting. A compact, one-day session was as crowded with good information as a conference on a regional level.

Opened by McCulloch as program chairman, after introduction by Leonard Carlon, section chairman, J. A. Setter of General Electric Co. presented a movie on playground lighting, which emphasized the value of outdoor and lighted playgrounds as a deterrent to juvenile crime.

Street lighting was covered by Stan Starr of Revere Electric Co. He said the West was fortunate that it could take advantage of new developments with less expensive obsolescence. Elsewhere street lighting is not keeping up with the growth, either in population or business. He urged working with the local councilmen or aldermen or supervisors to develop more traffic safety lighting, and use of lighting as a deterrent to crime, a stimulus to trade and an object of civic pride. He showed many illustrations of street lighting, floodlighting and other outdoor lighting applications.

Trends in floodlighting were covered by Robert E. Faucett of General Electric Co., Hendersonville, N. C. Jokingly bringing forth a "competitor's floodlight" made of a coal scuttle, he used it to illustrate the four points of floodlight design —lamp size, reflector shape, reflection surface and cover glass. The new NEMA standards, he said, permit specifications without trade names by typing the beam patterns by numbers from I to VI (I being the narrow beam, and V the widest.)

Glassware for outdoor lighting was described by A. R. Jaeger, Corning Glass Works. He spoke of the special characteristics of glass designed for outdoor lighting service and demonstrated the strength, the temperature resistance and other qualities with surprising results. He showed a 2-kw heating element of glass, which he doused with ice water without breaking it.

As a relief from the seriousness of the other sessions, W. A. Cyr gave his talk kidding the members and suggesting research into dark.

The role of plastics in outdoor lighting was then disclosed by Hal A. Williams of Rohm & Haas. He discussed a wide variety of plastics of the thermosetting and thermoplastic types, the acrylics, polystyrenes and vinyls. The acrylics, he declared, have greater stability exposed to the weather and have been tested by long use in aircraft and in tail light lens assemblies and in signs. Acrylic is available in large sheets or in molding powder to be shaped as required. He again showed slides of street lighting units, signs, lenses and luminous panels as well as vapor-type fixtures employing acrylic plastics.

Sign maker James Howenstein of Neon Products Inc., Lima, Ohio, introduced a logical but novel idea as he discussed the five or six types of plastics used in the sign business. After evaluating the various types of plastics, he went on to predict packaged units or modules that would self-contain the lighting equipment and require only connection to the electrical system. They would be so designed as to be put side by side or end to end, even to cover the entire sides of buildings or billboards. He also held hope for electroluminescence if large enough panels can be produced. This would provide a means of getting very thin signs or panels upon which the designs or letters could be built in.

Something that bothers many areas of the country and the north especially, low temperature, was next discussed as to its effect on lighting systems by Eugene Beggs of Westinghouse Lamp Division, Bloomfield. Lighting outdoors is growing faster in the West than in

Starr Revere **Beggs** Westinghouse **Jaeger** Corning **Faucett** General Electric **Lindsay** G-E Lamp

Williams Rohm & Hass **Howenstein** Neon Products **Setter** G-E, Denver

any place in the nation, he said. The effect of temperature on incandescent and mercury lamps is negligible but up until recently has been a deterrent in the use of fluorescent lamps. However, the new types of instant-start and rapid-start lamps and new fixture designs permit efficient operation, even in minus zero temperatures, he said. This is true if the lamps have sufficient voltage.

Outdoor applications of the new light sources were described by E. A. Lindsay of General Electric Lamp Division, Nela Park. He showed the new incandescent lamps with 15% increased efficiency because of redesign of the filament. Other lamps he showed were new reflector lamps, sealed beam lamps of new sizes down to 75 w, infrared high temperature quartz lamps for heating and modified color mercury lamps as well as the power groove fluorescent. Outdoor lighting systems are now beginning to compete with daylight, he said, rather than with darkness.

The evening dinner was addressed by President Waterman, who flew in, delayed but faithful. He gave a similar address to those given at the regional conferences, stressing the chapter activities particularly. It was here, he said, that discussion could be conducted and all would learn from it. Describing the discussions had at Victoria and Albuquerque, he commended the programs for that reason. He also touched upon the research activities of the society and closed with a message urging a greater understanding of people to make illumination an art as well as a science. About 70 people attended.

New Name, New Program

Emerging with a new name and a broadened program to cover parts of three states instead of two, what used to be called the Utah-Idaho Chapter of National Electrical Contractors Assn. held its largest and most successful all-chapter membership meeting in Salt Lake City April 13. Robert Bauchman, Idaho Falls Electric Co., chapter president, presided and A. R. Woolley, chapter manager, made the program and arrangements.

Two most important actions of the meeting were to change the bylaws and the name of the chapter in order to accommodate an enlarged membership extending into western Colorado. The name was changed to Intermountain Chapter to encompass the enlarged area.

Most significant change in the bylaws was to decentralize the chapter and to permit its reorganization on a group basis. Any three or more contractors who cover the area of a town may form a group and appoint a chairman. This chairman becomes a member of the board of the chapter. A percentage of the dues paid into the chapter fund is returned to the group to be used locally for its own activities. The chapter still has divisions based on wage areas for the purpose of collective bargaining but the operations of the chapter will be handled locally in their individual groups.

The meeting began with a breakfast of the board, to which all who wished to attend were invited. There were 30 present for a hunter-style self-service breakfast at the Utah Hotel. The entire group was guests of the Utah Power & Light Co. for a luncheon. It was addressed by Olin H. Ririe, assistant to the president, who talked on the general subject of the interdependence of the different branches of the electrical industry. There were 59 present at the luncheon. The morning session had 36 present. It was announced that the chapter membership had reached 52, including 9 new members from the Grand Junction, Rifle, Montrose area.

In addition to revision of the bylaws the group heard a detailed report of the Chapter Managers Institute meeting attended by Woolley. The latter also presented to the group an outline of a joint board plan which was approved by the membership. The membership likewise endorsed the educational program Woolley had been carrying on among nonmember and member groups along the lines of the economics of contracting.

A forward-looking proposal was made to the membership by Manager Woolley as a means to meet realistically the labor and management problem of the small community. He proposed that a classification known as Shop Journeymen be negotiated with the union, such men to be on a permanent pay-roll basis to handle the regular small job community work rather than the large-scale government or big industrial projects. This proposal will be reported in full in a later issue.

A meeting of the chapter at Ogden June 1 was scheduled to take the first steps toward bringing about a joint industry board.

Next general membership meeting of the chapter will be held over the Labor Day week-end at Sun Valley where a combination vacation and business meeting will be conducted.

Manager Woolley, President Bauchman

NEW
FAST-APPROACH
HYDRAULIC PUMP
For conduit benders
two-speed action
saves time, money

GREENLEE No. 798-AC

The new GREENLEE No. 798-AC Hydraulic Power Pump operates GREENLEE Conduit and Pipe Benders *three to five times faster* than a hand pump. (Teams with other conduit benders, too.) Exclusive GREENLEE fast approach, with automatic change-over to lower speed high-pressure drive, eliminates costly waiting time, makes jobs go faster and easier. Electric motor-driven pump develops 6,000 psi continuous pressure, up to 10,000 psi intermittent. Also speeds work with knockout punch drivers and other hydraulic tools.

GREENLEE Send coupon

GREENLEE TOOL CO.
1767 Columbia Ave.
Rockford, Illinois

Please send illustrated Bulletin E-223 on Greenlee No. 798-AC Portable Hydraulic Power Pumps.

NAME _____

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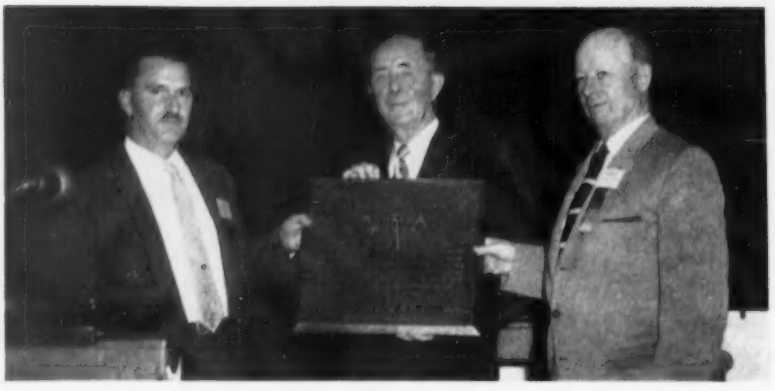
CITY AND STATE _____



Galen Naylor and A. L. Rowe present C. J. Burns, center, a plaque to—

Honor Montana Power

Montana's electrical contracting industry has awarded a bronze plaque to J. E. Corette, president of Montana Power Co., and the company itself for furthering development of free enterprise which has meant better electrical living for the public.

Galen Naylor and A. L. Rowe, officers of the Montana Chapter of the National Electrical Contractors Assn., presented the plaque to the company at a banquet ending the first annual convention of the electrical industry in Montana, at Butte. C. J. Burns, vice-president, accepted it on behalf of the entire electrical industry. He pledged his firm's continued support and leadership in developing free enterprise.

Robert P. Burns of Butte, manager of the Montana NECA Chapter, said Montana Power had taken up the fight for free enterprise when others declined to have any part in it. He said everyone would rise to fight an aggressor from a foreign land, but few are striking at the foe of private enterprise now stalking the land.

The Montana NECA manager got wide support for his suggestion, voiced at a convention session, that a Montana Electrical League be formed, representing all phases of the industry—contractors, suppliers, appliance dealers, builders, architects, labor and the utilities. Committees now are acting on his proposal.

Various speakers discussed banking, the relationship of the electrical distributor to the electrical contractor, the role and importance of credit in the American economic system, proper accounting records, liability programs, new product development.

PCEA Uniform Code Readied

Important new support has been gained during recent weeks for the PCEA's uniform electrical code.

After having operated for a time under a different code, which had been prepared by a group of inspectors, the city of Culver City has now indicated that it will adopt the uniform code.

The code with which Culver City experimented has now been adjudged unconstitutional in the case Agnew vs the city of Culver City.

M. Tellefson, city attorney of Culver City, has notified L. D. Price, manager of the engineering and safety regulations department of the National Electrical Manufacturers Assn., and Victor W. Hartley, managing director of the PCEA, as follows:

". . . I am now recommending that we adopt the current issue of the uniform electrical code as a primary code, with the others as secondary, under the procedure authorized by the statute you referred to . . ."

Legal soundness of the uniform electrical code had previously been strengthened by the fact that it was carefully edited and approved by a committee of city attorneys designated by the League of California Cities. Subsequent to this, the State of California had passed an order stating that all building codes adopted by reference would have to

be approved by the attorney general.

The uniform electrical code, which was first drafted in 1927, is kept up to date by being revised every time the National Electrical Code is amended. This occurs approximately every two years.

Standardization of city and county regulations is considered important not only for the electrical industry but for the customers as well, because it reduces the size of inventories that distributors and contractors must keep and eliminates the time that architects, designers and contractors must spend in learning varying sets of regulations for each place where they work.

It is hoped by the code and ordinance committee of the PCEA that this new recognition of the validity of the code will further its acceptance beyond the present 170 cities and counties that are now using it in California.

President-elect George N. Hawley has named the following men to head section activities of PCEA for the administrative year commencing July 1. (Committees will be announced later.)

Administrative Services Section—W. N. Fairlee, PG and E, chairman; E. B. Kruger, Southern California Edison Co., vice-chairman.

Business Development Section—J. Clark Chamberlain, Bureau of Home Appliances of San Diego County, chairman; Gordon F. Black, Rome Cable Corp., San Francisco, vice-chairman.

Engineering and Operating Section—J. H. Drake, Southern California Edison, chairman; R. L. Brinton, PG and E, vice-chairman.

At a meeting of the board of directors held during the recent annual convention in San Francisco, the following were appointed to serve as regional vice-presidents of the association: Arizona, Walter T. Lucking, Arizona Public Service Co.; Hawaii, Leslie A. Hicks, the Hawaiian Electric Co.; Nevada, Reid Gardner, Southern Nevada Power Co.; Northern California, C. C. Walker, General Electric Co.; Southern California, C. A. Wikle, A. S Schulman Electric Co..

A certificate of award has been presented to PCEA (Hawaii) by the Newspaper Advertising Executives Assn. Inc. "for outstanding newspaper advertising published in the Honolulu *Advertiser* and exhibited at the 1957 annual meeting, Edgewater Beach Hotel, Chicago, Jan. 20-23, 1957." The Honolulu *Advertiser* presented the award to George Rinker, chairman of the Business Development Section.

Monarch
RENEWABLE FUSES

One dependable quality with BETTER PROTECTION ...OVER A LONGER OPERATING PERIOD ...AT THE REGULAR FUSE PRICE

This is the Monarch LONG LASTING Renewable ferrule type fuse

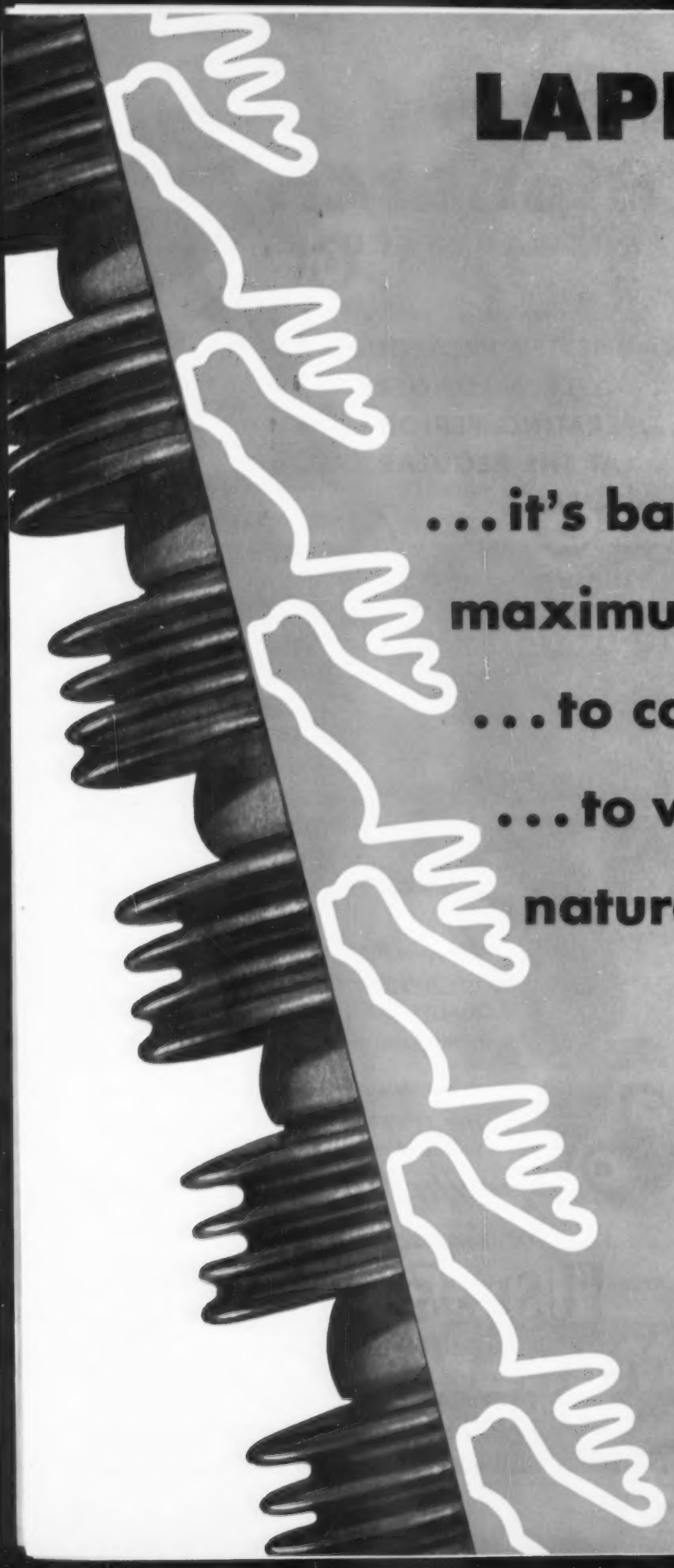
Discriminating users have specified these fuses for many years because of their QUALITY CONSTRUCTION permitting easy access for cleaning and speedy Mon-o-lag link replacement

Because Monarch Fuses are made from raw material to final inspection under our own QUALITY CONTROL—we are able to make strong claims and GUARANTEE long service.

A complete line of knife blade and ferrule type renewable and one-time fuses; plug fuses and spring clips.

Specify Monarch Fuses for improved FUSErvice

Monarch
ELECTRIC CORPORATION
Jamestown, New York



LAPP FOG-

...it's based on maximum exposure ...to contamination ...to wetting ...to natural cleaning

WESTERN REPRESENTATIVES:
Los Angeles: Earl S. Condon Co.
San Francisco: C. E. Ingalls & Sons
Seattle: Charles F. James
Butte: R. E. McDonough Co.
Salt Lake City: Riter Engineering Co.

TYPE DESIGN

Nobody wants power arcovers. They cause service interruptions, set fire to equipment, add to maintenance costs, and pull line crews out of bed on foul nights.

But power lines do have to run through areas where dust, salt-spray, chemicals—even automotive exhaust fumes—combine with fog or rain to coat insulators with a conductive material such that leakage flashover can occur unless special steps are taken to avoid it.

The "special steps" begin, usually, with increasing the length of leakage path. The distinguishing characteristic of every "fog type" design is the extra inches of leakage distance it provides.

Dozens (maybe hundreds) of insulator designs have been produced for operation under contaminated atmospheric conditions. All have had extra leakage distance, but few have merited a second order by a user. So it must be that the geometry of the increased leakage surface has something to do with its effectiveness.

There is one design that has been successful. It has a record of more than thirty years on this job and has generally been adopted for all types of porcelain insulators for outdoor service.

This is a brief story of the technical considerations back of this design and of the reasons why it can save you money by reducing insulator cleaning, avoiding outages, and providing more dependable operation than is possible with any other type of insulator.

The effect of any contaminant, spread over all or part of an insulator surface, is to lower the surface resistance, thus allowing more leakage current to flow.

It is here that most errors occur in the thinking about contamination problems. Most people, at first thought, consider leakage current bad—that it should be prevented from flowing. As a matter of fact, however, it is the leakage current that saves the insulator, because it is continually drying and correcting the low resistance which fog or drizzle has caused.

Variations in thickness, width of path, and wetness in various areas of the surface result in non-uniform leakage surfaces. These variations are caused by the cleaning action of wind and rain, by non-uniformity in width of surface, by shielding parts of the surface from rain. When rain falls on a dirty insulator, resistance of the wet part is lowered. Since the total resistance is reduced, more current flows, but this current dries the shielded high-resistance areas even more rapidly. Thus voltage piles up over these high-resistance sections, showing increasing fire and arcing, precipitating flashover.

It's the dry, high-resistance areas of insulator surface that start flashover, and any attempt to shield insulators, or parts of them, is to invite flashovers by creating "hot spots" which initiate the flashovers.

The Lapp principle of Fog-Type design seeks uniformity and tries to obtain this uniformity by maximum exposure—to contamination, to wetting, to natural cleaning by wind and rain. It is typified by short petticoats, spaced to avoid pockets where contamination and moisture can accumulate. In the suspension unit, the smooth underside is also designed for maximum exposure with no restricting baffles to prevent cleaning. Spacing of petticoats is designed to obtain natural cleaning from water flow and splashing from below.

In most areas, no cleaning of Lapp Fog-Type insulators is required. Where a program of maintenance cleaning is necessary, time intervals for cleaning Lapp units may be extended beyond that required for other types of insulators, and the fully exposed leakage path makes such cleaning easy, fast, and economical.

The merit of this principle, and of the design, is confirmed by the service record of Lapp Fog-Type units. Those we ship today look just about like those we produced thirty years ago, and users of these thirty-year-old units have had little reason to look for new concepts of fog design. In the years since, the principle has been adapted to many types of outdoor insulators. Identical fog-type corrugations, used extensively today for high voltage bushings, have obsoleted the wide, spreading petticoats which were previously standard. Major advantages in performance, both mechanical and electrical, of Line Post and Station Post insulators are derived from the adoption of these designs of Lapp Fog-Type corrugations.

You improve the service record of your system, save your company maintenance expense, and improve the sleeping habits of your line crews every time you build a line on Lapp Fog-Type insulators.

Lapp Insulator Co., Inc., Le Roy, N. Y.

W. A. Huckins, center, talks over plans for the Whopper compaign with Darcie White, left, and Lamar Holt. Trade-in allowances were made to . . .

Scrap Old Appliances

Utah Power & Light Co. believes that the place for obsolete and inefficient ranges and water heaters is on the scrap heap. To remove them from the used market and to replace them with new electric appliances the company again offered incentive trade-in allowances – this year during its April-May Whopper campaign. A range brought $25 and a water heater $35 on trade-ins through retail dealers.

New this year was the promotion by the company of quick recovery water heaters. Utah Power & Light recently revised its rate schedules to permit use of these units and the campaign publicly emphasized their availability. With more than 53,000 electric water heaters in use, the campaign was directed to replacing obsolete flame-type and small electric units with insufficient capacity for present and future needs.

There are more than 95,000 electric ranges on UP&L lines, according to W. A. Huckins, manager of the business development department, and many are from 15 to 30 years old. In addition there are about 84,000 old-fashioned flame-type cook stoves in the territory.

The colorful booklet announcing the campaign carried complete rules, a supply of tags and blanks for dealer use and details of the advertising support being given by the company. Newspaper, radio and television advertising was supplemented by bus cards, billboards and direct mail. All ads were eye catching and many were in color.

Co-sponsors with UP&L and its subsidiary, Western Colorado Power Co., in the Whopper campaign were electric dealers and Intermountain Electrical Assn. Heading activities for the company were Huckins, Darcie H. White, his assistant, and D. L. Holt, residential and farm director.

Although complete reports will not be available for this issue, the history of such company activities indicates that a lot of old ranges and water heaters will reach the scrap heap. The replacement drive last year netted 2,517 ranges (1,103 replacing flame type) and 1,698 water heaters (1,077 replacing gas, coal and oil).

The Quick Recovery Story

Because the quick recovery water heater has just been accepted on UP&L lines, Evelyn Hansen, home service director, wanted a simple and effective way to present it to homemakers. She, therefore, devised a demonstration board consisting of a simple reproduction of a water heater (with an adjustable curtain

Evelyn Hansen, UP&L home service director, shows the demonstrator she made up to tell homemakers about the quick recovery water heater, recently accepted on company lines. It shows that the unit gives three times the capacity for eleven cents a day, less than the cost of two bottles of soft drink; lists its features and conveniences—

Company ads had pulling power

This window display in company's Salt Lake office started off program

to indicate hot and cold water levels) and a flannel board to emphasize various parts of her story.

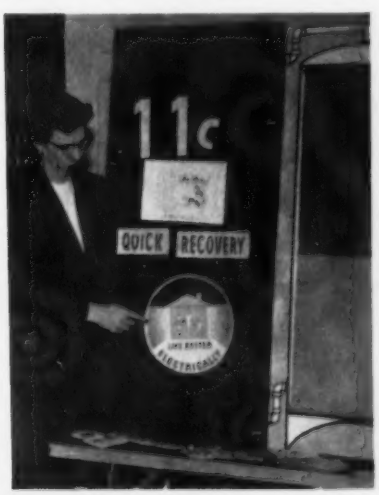
With blue to represent cold and red, hot water, she is able to show the ratio in the tank as the morning baths are taken and the household tasks completed. This leads naturally to the advantages of the quick recovery unit for modern families that use larger quantities of hot water early in the morning.

The chatty and smooth flowing script goes on to tell the number of gallons per hour heated with old and quick recovery units; the cost per day and month and in relation to other family needs; features and conveniences. And as the home economist tells her story, she places the simple illustrations on the flannel board, giving both verbal and visual appeal.

The demonstration board, while large enough to be effective before a group, can be carried in an automobile and is easily assembled by the home economist.

Miss Hansen made up the first one herself, writing the script and preparing her own illustrations. With the model shown in the accompanying pictures as a guide, boards were constructed for each of the company's home economists.

Color TV Given A Boost



—Program ends with "Why Worry—Quick recovery—Live Better Electrically." The audience has had the full story

From May 15-18, effort was made to crash the TV color barrier in Salt Lake City. More specifically, it was the object to "Say It Isn't So" to the public idea that color-set prices would be brought down by waiting "Until the Real Thing Comes Along"—to prove that color is here now and that prices are not apt to go lower.

Station KTVT, local outlet for NBC color programs, ran announcements that for the first time color programs would originate in Salt Lake City. Downtown department store, Zion's Cooperative Mercantile Institution, inserted in its regular newspaper advertising daily invitations to see the shows, without charge, at the store. Studio equipment and production know-how was furnished by the RCA-DuPont Color Caravan, set up in ZCMI's third-floor auditorium.

The live shows included demonstrations of the appearance of objects telecast in black and white as contrasted with color, and how color aids in recognition. In addition, ZCMI designed sets and presented shows with the store's own models of millinery, furs, the various other apparel departments and the home furnishings department.

Three shows a day were piped by closed circuit to color sets in the store's TV department. For three days, ZCMI's daily 10:30 p.m. news feature *Today in Pictures* and 30 minutes of its 3 p.m. *Club 4* interview program were colorcast through the KTVT transmitter. The street parade on Armed Forces Day also was colorcast.

Not all who attended the shows or watched the sets saw a full performance, but checkers estimated an attendance of 100 to 125 at each showing for a total of more than 1,200.

The combination washer-dryer was getting the attention at the Westinghouse booth. Here Gene Lambeth and Bill Shafer of Distributors Inc. and Wilma Breedlove of H. L. Benbough Co. point out the features. In background is Fran Osborne, Monsanto Chemical Co. In the Hotpoint booth, right, was Ray Guibord, a newcomer to San Diego and to the company's major appliance sales force there. Hotpoint was exhibiting its electronic range and TV models

Philco's Smoke-'N-Odor Stop, accessory for its 30- and 40-in. ranges, was displayed by R. E. Harris, wholesale distributor, and Louie Jorgensen. The gadget plugs into outlet; adjusts to element size. Right: Al Fisher, right, new with Frigidaire Sales Corp., talks to Jack Montgomery, Helland Appliance Co., in company space. Fisher succeeded Reg Payne

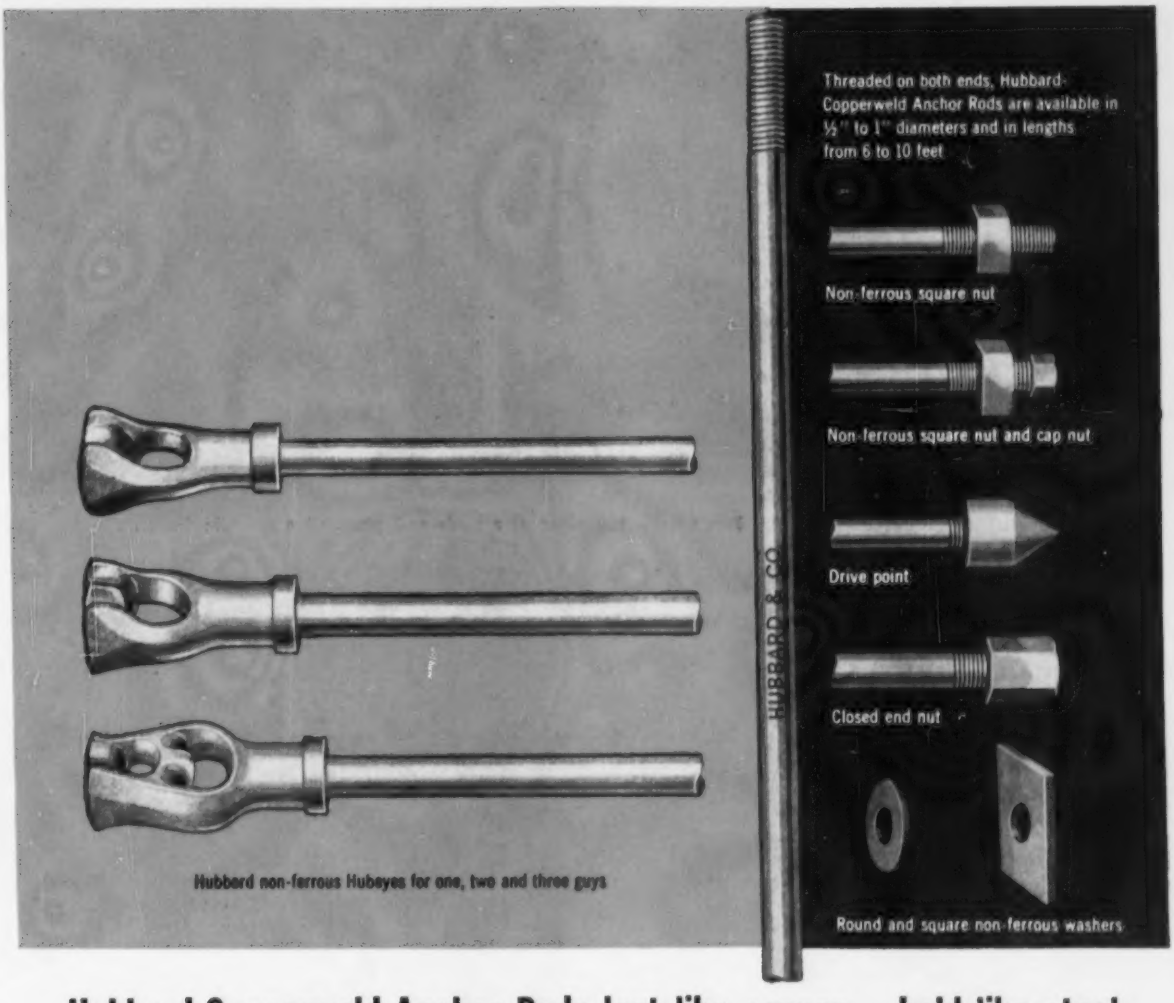
A Fair of Home Ideas

The pictures on this page show just a few of the exhibitors at the Fair of Modern Home Ideas sponsored recently by the San Diego Bureau of Home Appliances. Kitchens were a special attraction at this year's show and wherever a planning service was offered there were crowds.

As a new venture, outside displays were added and proved a popular part of the show. The Luxtrol Coach with its lighting control displays was there under sponsorship of San Diego Gas & Electric Co. Garden lighting, a telephone exhibit and a demonstration of the Army's Nike guided missile were additional outdoor attractions.

Another big drawing card was the Housepower House, put in by the bureau's Electrical Contractors Division to promote better wiring.

St. Charles Kitchens put in a display to show what planning can do to give convenience in a small space


Hubbard non-ferrous Hubeyes for one, two and three guys
HUBBARD & CO.
Threaded on both ends, Hubbard-Copperweld Anchor Rods are available in ½" to 1" diameters and in lengths from 6 to 10 feet
Non-ferrous square nut
Non-ferrous square nut and cap nut
Drive point
Closed end nut
Round and square non-ferrous washers

Hubbard-Copperweld Anchor Rods last like copper... hold like steel

Corrosive soils and surface water, perpetual enemies of anchor rods, more than meet their match when they attack Hubbard-Copperweld Anchor Rods. The molten-welded copper exterior of the rod provides the permanence of copper to prevent rust and corrosion. The steel core assures a strong, dependable anchor for overhead lines.

Hubbard-Copperweld anchor rods and accessories are carried in stock and sold exclusively by leading electrical distributors everywhere. A phone call to your nearby Hubbard Distributors' storeroom will bring immediate deliveries to your warehouse.

When you specify Copperweld you get quality. When you specify Hubbard you will get extra quick service. You are sure of an ample stock of the right sizes and combinations for your job. Deliveries are fast . . . more than two hundred electrical distributors handle Hubbard Hardware. There's one near you.

HUBBARD AND COMPANY

Pittsburgh 1, Pennsylvania
Chicago, Illinois
Oakland, California
Plano (Dallas), Texas

LIVE BETTER ELECTRICALLY

PGE's program for the 1956 Electri-Living Home took top national awards and provided a formula for . . .

Promoting Model Homes

Crowds stood in line to see the model home; some 30,000 inspected it

A workable formula for promoting model homes was developed by Portland General Electric Co. to win first-place honors in the 1956 Electri-Living home building program.

In a competitive area offering many model homes, some 30,000 people toured the house during its four-week showing. Its promotion brought top national awards from Living for Young Homemakers magazine, the sponsor, to PGE, utility co-sponsor, and to Builder Jack Nunn.

PGE hung its promotion on four fundamental precepts:

1. It worked with a well-designed, well-built home.

2. It took a positive "go-all-the-way" attitude about promotion and advertising.

3. It maintained a close liaison between sales and advertising and publicity departments.

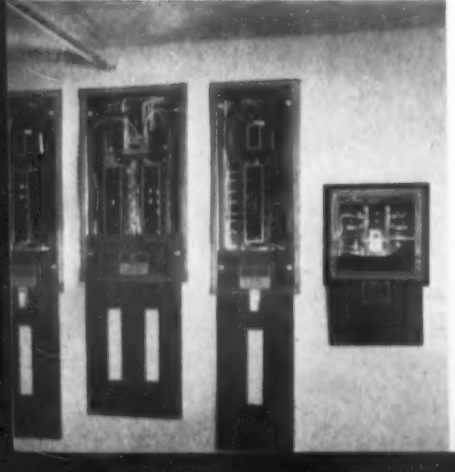
4. It had complete control over promotional and advertising activities. Builder and suppliers were concerned strictly with the physical features of the home.

Since the company sponsored the home in conjunction with *Living for Young Homemakers*, it was able to capitalize on supporting national publicity. The magazine's promotion was conducted in 23 cities in which Electri-Living homes were constructed.

From the outset, PGE made certain that all subcontractors and suppliers were fully informed on what it was doing to promote the home. At an initial meeting of the utility and its advertising agency, the builder, architect, subcontractors and suppliers, PGE told its promotion plans and invited those interested to tie in. It offered the services of its advertising agency to help design tie-in ads.

Before the formal opening, men handling sale of homes in the development and assigned to staff the model during its showing were briefed by builder, architect and utility. They were given complete information about materials and equipment and took home mimeographed copies of the material to study. The utility's sales staff assisted tract salesmen during the open house so that there was always someone on hand to show visitors through the home and answer questions.

Two previews were held on two separate days, one for utility, building and city officials, the other for



Home's 400-amp service and distribution panels have 35-circuit capacity

the press. Refreshments were served at these previews, which ran from 4 to 9 p.m. A loose-leaf press kit explaining important features of the home was given to newspaper, radio and TV staff.

Both metropolitan papers ran a record amount of editorial lineage and one devoted the cover of its home and garden section and about three pages to outstanding electrical features. PGE's home service advisers and a representative of the sponsoring magazine made frequent appearances on both local radio and TV stations.

Visitors Interviewed

Advertising broke on the Sunday opening day in the classified section of both Portland newspapers. A continuing series of ads, in varying sizes, ran during the four-week period, all in the classified sections. Every Sunday, between 2 and 4 p.m., a mobile unit of a radio station stood by while visitors were interviewed on what they liked best about the home.

A brief ribbon-cutting ceremony was held on the opening Sunday. A PGE representative, acting as mc, welcomed a line-up of visitors and introduced the builder and the local presidents of the homebuilders association and of the architects institute. Despite rain opening day, almost 5,000 visitors were counted by an electric eye, located at a central point.

In promoting the home, PGE's basic premise was to present a houseful of electrical ideas that visitors could apply in their own homes. The brochure distributed to the public explained that the ideas built into the Electri-Living home were theirs to use whether they were building, buying or modernizing.

The utility feels that the home was a means of demonstrating dramatically the advantages of living better electrically. More than 30,000 people—almost one-sixth of area population—saw at firsthand what housepower actually is and why it is necessary to have it in order to live better electrically. They inspected a home with 400-amp service, 35 circuits and more than 150 outlets; they talked over the intercommunication system; saw good lighting demonstrated; took a look at a dream kitchen; enjoyed electric heat.

Because the home was so well received, PGE had an exact scale model made and is showing it currently at fairs, home shows and expositions throughout its service area. The original brochure has been keyed to an all-electric idea home and is distributed with the display.

Virginia Nelson (center) of Meier & Frank Co., chairman of Oregon Chapter, Electrical Women's Round Table, with Grace Schoeni, PGE (left), and Grace Phipps, PP&L, Workshop chairmen. The Portland program . . .

Presented Appliance Lines

Opportunity for exchange of ideas between a group engaged in buyer education and representatives of the electrical industry was provided in the recent Live Better Electrically Workshop sponsored by the Oregon Chapter, Electrical Women's Round Table, for home extension agents.

The three-day program, chairmanned by Grace Schoeni, Portland General Electric Co., and Grace Phipps, Pacific Power & Light Co., presented complete 1957 appliance lines with one appliance of each manufacturer highlighted to show procedures and techniques for the industry.

Meetings were held in the headquarters of manufacturers and distributors, with the group visiting eight firms. Speakers included both extension workers and industry members.

In addition to giving information on special features of all major lines, the program fostered a better understanding of the household equipment market today. Extension people learned about manufacturer and distributor problems and how they are being solved. They were told what the industry is doing in buyer education.

That this sort of information was needed was provided by questions received in advance from homemakers and agents and used to guide the discussion and presentations. One person, inquiring what help was being given dealers on use of equipment, said that a certain salesman, when asked about the effectiveness of a new appliance feature, replied: "I don't know. I have never seen it used and have sold none. . ."

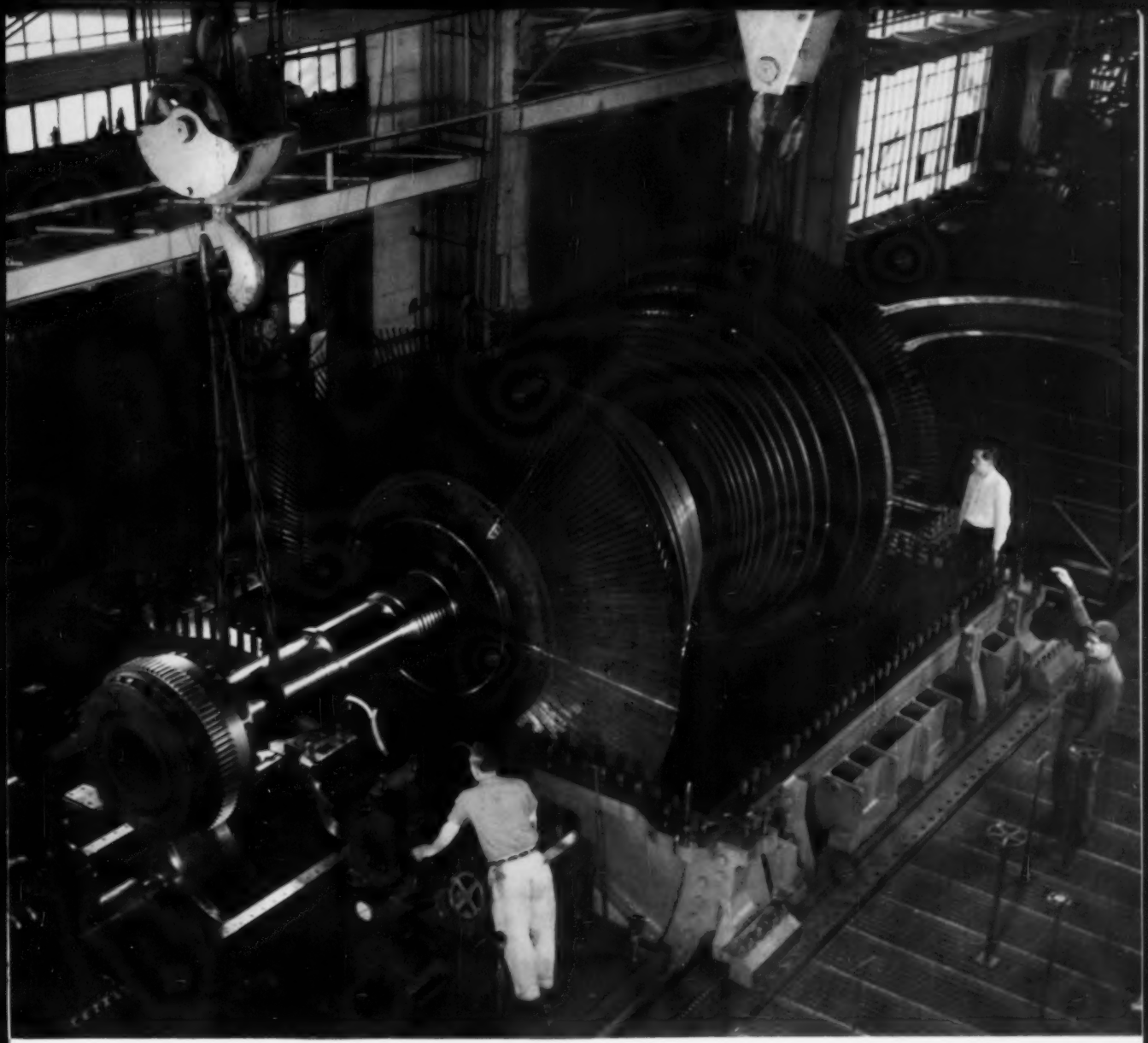
RMEL Committee Honored Again

Another honor has come to the automatic washer appliance advisory committee of the Rocky Mountain Electrical League. The committee, which has become nationally known, was a feature at the vocational workshop conducted in June at Colorado State University in Fort Collins. The 10-member committee conducted a regular meeting at the workshop to show how it functions. Leaders in the activity were Ray Jones, one of the committee founders and original chairman, and Aud Hanna, both of Denver.

HAWAII'S FIRST HOME SHOW, held recently in Kaiser's Dome at Honolulu, was visited by some 20,000 in a three-day run. Result of long-range planning, the show grew out of a suggestion made more than a year ago by Operation Home Improvement and the Honolulu Chamber of Commerce; was sponsored by the chamber and the Home Builders Assn. Home improvement was the theme of the 30 exhibits, with use of color in kitchens and bathrooms a big attention getter. Hawaiian Electric Co. coordinated displays showing electrical equipment and company home economists conducted all cooking demonstrations

A LIVE BETTER ELECTRICALLY supplement to the Sunday Oregonian ran 40 pages and gave emphasis to Pacific Power & Light Co.'s recent LBE pitch for its trade allies. Looking over the paper are the two men who alternated as PP&L representatives at the spring meetings around the company system: Wes Dunn, left, residential sales manager, and Cecil Root, director of special services

LIGHTS OUT—Sales department employees of Montana Power Co. gathered in Butte to promote the Live Better ... Electrically program and preview the Housepower sales training course. They were shown a display that demonstrates how adding more appliances to the same circuits cuts efficiency of the appliances and eventually blows a fuse or trips a circuit breaker. The model home was designed and executed by Paul Schwartz (on left with hand extended over house) and Rich Heath (right with pointer). D. J. McGonigle, general sales manager, is in the center



VIBRATION CONTROL . . . makes Westinghouse turbine-generators the smoothest in operation

Of course, every rotating machine has a certain degree of vibration . . . how much, is the important factor.

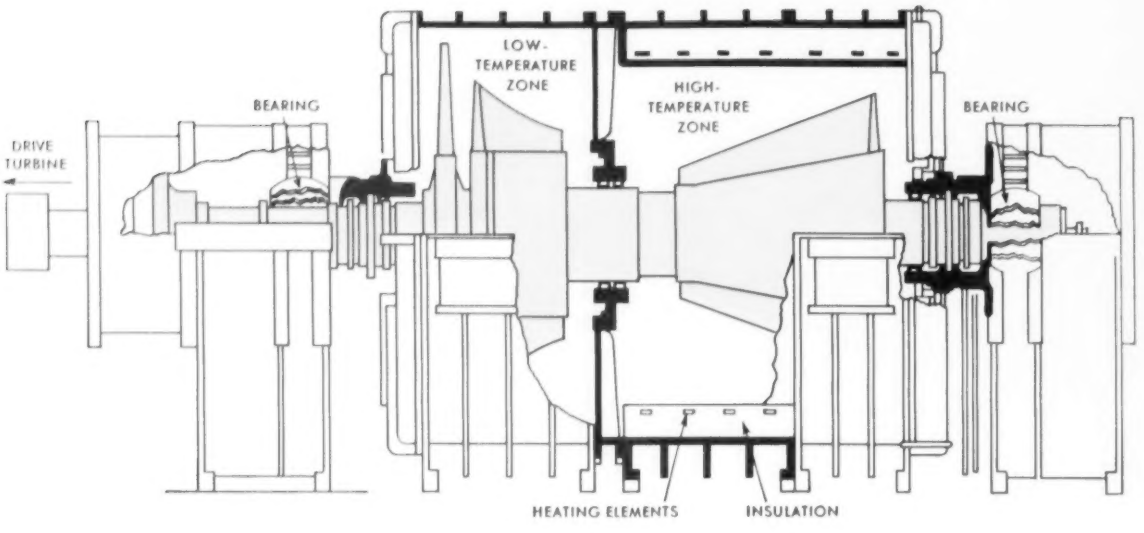
For years, Westinghouse has enjoyed a reputation for dependable, smooth-running turbine-generators. That reputation hasn't "just happened" . . . it is the result of years of hard work and intensive engineering.

The above "heater box" test equipment was designed and built . . . pioneered . . . by Westinghouse. It is the principal reason why Westinghouse turbines run smoothly from start-up. Field balancing is practically eliminated.

YOU CAN BE SURE... IF IT'S Westinghouse

TURN THE PAGE TO SEE WHY...

Westinghouse "heater box" balancing . . . makes the difference

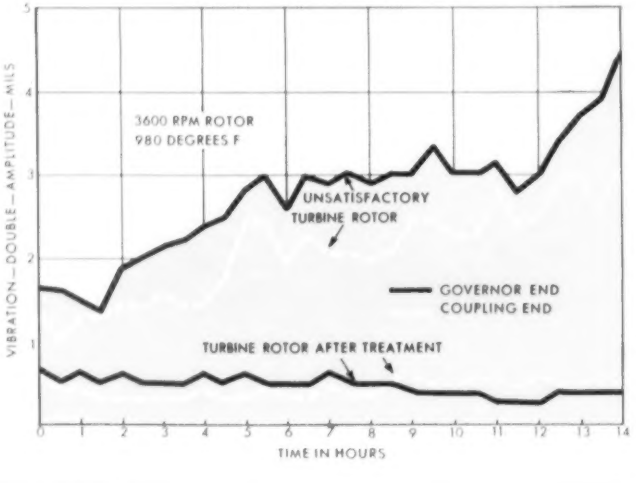


Diagrammatic sketch shows arrangement of typical Westinghouse "heater box." This is one of several in which high-temperature rotors are tested at full speed and operating temperature.

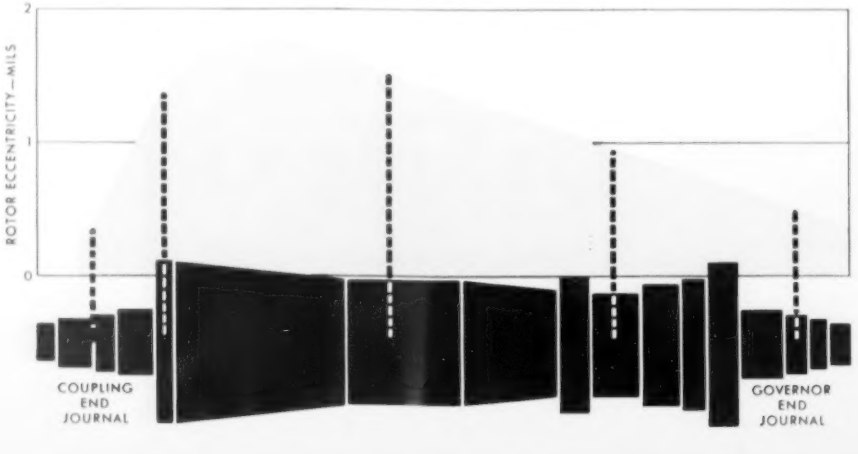
To have assurance of permanent balance, experience has proved it necessary to subject high-temperature turbine rotors to full-speed test at operating temperatures. Otherwise, balance characteristics, carefully developed during manufacture, may alter unpredictably when the machine is installed and operated.

For this reason, Westinghouse developed the "heater box."

Result: Westinghouse turbines . . . and only Westinghouse turbines . . . achieve a degree of permanence in balancing *prior to shipment* that is unequaled. Field balancing is practically eliminated.

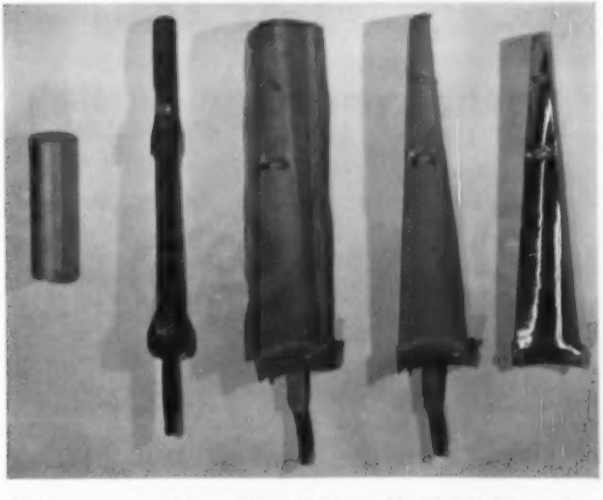


Vibration record. Upper curve indicates vibration build-up during full-speed run in a "heater box." Lower curve shows vibration record of the same rotor after "heater box" run and balancing.



Permanent rotor bowing is an example of what can happen after a rotor is run at full speed and operating temperature. With the "heater box" test, this can be detected and corrected prior to shipment.

Precision forging of a large blade to basic shape. Below: From billet to blade . . . only minor trimming of the blade and machining of the root are required after forging.



Blades are grouped by welding the integral lashing stubs together.

Precision forging and vibration control of blades

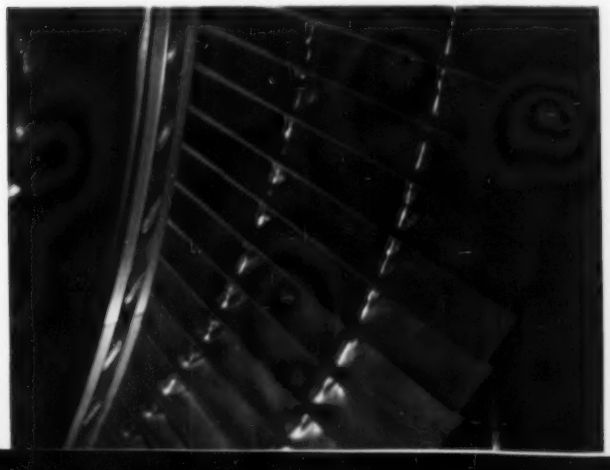
Since forged material offers the best structural properties, Westinghouse has developed techniques to forge all large blades to basic shapes.

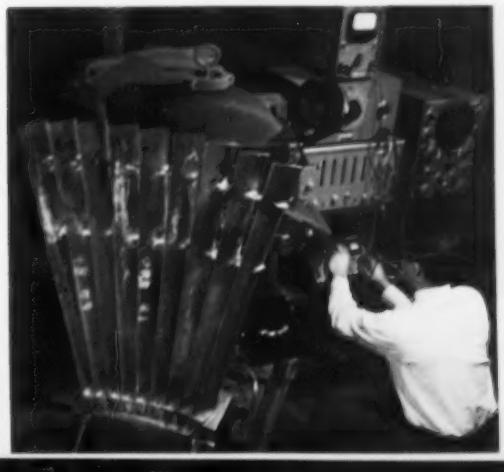
Westinghouse has also developed a method of forging lashing stubs integrally with the blade. This eliminates the possibility of heat of welding or brazing adversely affecting the metallurgical properties of the blade itself. After forging, only minor finishing is necessary to assure the thermodynamic and vibrational characteristics required by Westinghouse standards.

Each Westinghouse blade and group design is proved in extensive laboratory tests. These range from electronic tests of group designs, which determine natural frequencies, to rotating tests which check vibration at operating speed. Production line quality control makes certain that the established standards are built into the individual blades.

PLEASE TURN PAGE

Electromagnetic vibration test on a blade group in the laboratory. This electronic instrument checks the natural frequencies of the blade groups.





VIBRATION CONTROL in the generator rotor

Field balancing of Westinghouse generator rotors is seldom required because of the exacting care taken during all steps of manufacture, a fact verified by *shaft-riding*, vibration-sensing instruments.

Thermal Balancing—Prior to assembly, the Westinghouse generator rotor is checked in a high-speed balancing and seasoning box as shown above. Pioneered by Westinghouse, this testing technique assures the thermal stability of high-speed rotors. Heated to 130° C in this "heater box," the rotor is operated for eight hours at full speed. Any thermal distortion is detected and corrected, thereby eliminating this cause of vibration. The rotor is further checked for thermal balance in its own stator and bearings.

Slotted Pole Faces—Another feature pioneered by Westinghouse—transverse slots in the rotor pole faces equalize the moments of inertia about the two principal axes, thereby eliminating this cause of double-frequency vibration.

Alloyed Field Windings—More than 20 years ago, Westinghouse pioneered the use of cold-worked, silver-bearing copper which is not subject to permanent distortion and, therefore, helps to assure the mechanical stability of the rotor.

Both modern inner-cooled and conventional rotors are designed to take advantage of these time-proven techniques which assure smooth operation.

Contact your Westinghouse sales representative or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-50603

"Before" and "after" thermal balancing a generator rotor—a testing technique pioneered by Westinghouse.

YOU CAN BE SURE...IF IT'S Westinghouse

THIS MONTH'S NEWS

Nevada County Sues City of Los Angeles

District Attorney George Dickerson of Las Vegas, Nev., has filed a $138,600 civil action against the city of Los Angeles in an attempt to force payment of taxes to Clark County for the power generating facilities at Hoover Dam.

Dickerson also made demands on the California city for an additional $46,200 in taxes for the coming year, which should be paid within the next 30 days, it is contended.

The tax money is sought back to June 1, 1954, based on assessments on seven generators on the Nevada bank of the Colorado River which are owned by the Los Angeles Department of Water & Power. The generators are rated at 82,500 kva each.

Also named as a defendant in the suit is Southern Nevada Power Co., which the county is seeking to tax under the same ordinance.

Seattle Told to Combine Water and Electric Units

Seattle City Light will be combined with the water department into a single public utilities operation if the city accepts the recommendations of a firm of management consultants.

The Chicago firm of Booz, Allen & Hamilton is completing a five-month study of the administration of Seattle city government. The survey was initiated by Mayor Gordon S. Clinton with cooperation of the city council and carried out at a cost of $104,000. Recommendations are now in the hands of a civic administrative survey committee, which expected to make a report by July 1. Final action depends on the mayor and council, with some of the 300 recommendations requiring changes in state laws or the city charter.

Under the recommended city organization, Public Utilities would be one of four "offices" for operating functions, the others being public safety, public works and public health. The director of each office would be appointed by the mayor, with city council confirmation. Removal would require approval of both the mayor and the council. These same provisions now apply to the City Light superintendent, who would be appointed by the utilities director under the new plan, with approval of the mayor.

Four other offices would handle finance, legal affairs, administration and city planning. Responsible to the City Administrative Officer would be a personnel administration and a budget administration department, an administrative analysis department, a code research department and a public information department. Some of these offices and departments would handle work now under City Light.

Another Unit Working At Chief Joseph Dam

A 10th generating unit went into commercial production June 7 at Chief Joseph Dam on the Columbia River, two and one half weeks ahead of schedule. It was the third to be installed this year.

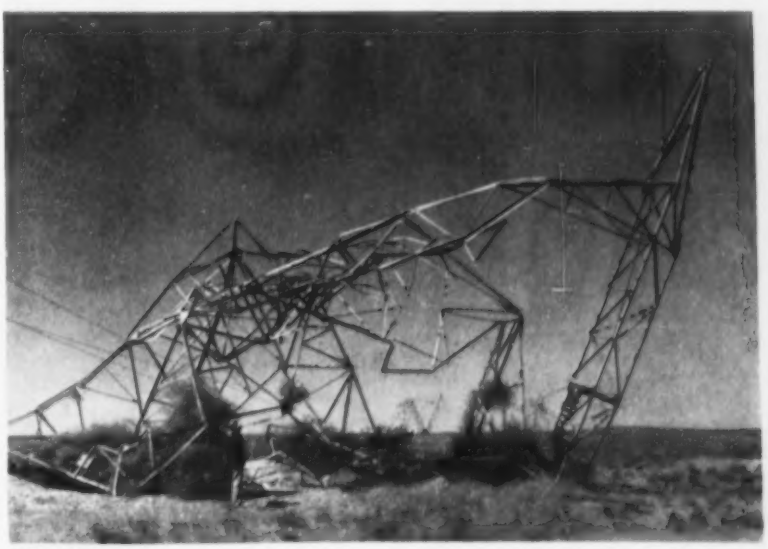
PUD to Build School At Hydro Project Site

As a part of its Priest Rapids power project on the Columbia River, the Grant County PUD of Ephrata, Wash., will construct a school at the town of Mattawa, which has been established because of the construction activity.

The PUD, under an act passed by the state legislature earlier this year, is allowed to make payments to a school district affected by PUD activity in the area. All residents of Mattawa either are involved in construction work at Priest Rapids or in providing services to construction workers.

The school will be a permanent masonry structure with four classrooms. The PUD will provide furnishings and equipment for 100 students, with the school district to provide for students above that number. Construction costs will be paid entirely by the PUD.

Strong Winds Down Towers



High winds of hurricane strength generated by a violent thunderstorm ripped and twisted 15 light steel towers into scrap and cut Bonneville Power Administration's McNary-Santiam 230-kv lines No 1 and 2 June 5. Dr. William A. Pearl, Bonneville administrator, said damage cost will be a minimum of $200,000, worst transmission line loss BPA has ever suffered. The storm, which swept diagonally across the northern portion of Oregon from east to west causing lesser outage troubles for distributing utilities in its path, apparently reached a climax as it hit the BPA line six miles west of Boardman, Ore. Other transmission lines picked up load

FOR Quality WITHOUT Question

The Beverly Hilton uses only the finest, from champagne to transformers.

450 KVA, three phase, dry type transformer. Primary 480 Secondary 208Y/120, 4—2 1/2% FCBN

The fabulous Beverly Hilton has installed Marcus Transformers with a total capacity of approximately 2000 KVA. This guarantees them complete dependability and uninterrupted, trouble-free service for their power and lighting distribution.

A complete line of dry and liquid-filled transformers up to 5000 KVA.

Representatives in Principal Cities

Marcus TRANSFORMER CO., Inc.
RAHWAY, NEW JERSEY

"Mark of Quality"

it's the EXTRA NEOPRENE puts the BRAWN in

BRONCO Certified 66 electrical cords and cables

It's the bonus quantity of Neoprene—67.32%, certified by a registered professional engineer—in the outer protecting jacket that gives Bronco 66 Certified its extra toughness, greater resistance to oil, ozone, sunlight, makes it more flameproof, more resilient and flexible.

SOLD NATIONALLY BY ELECTRICAL WHOLESALE DISTRIBUTORS
manufactured by
WESTERN INSULATED WIRE CO.
LOS ANGELES 58, CALIFORNIA

Fuel Costs Are Tied To Calectric Increase

Greatly increased fuel costs and the general impact of inflation on all phases of electric utility operations have forced California Electric Power Co. to apply to the California Public Utilities Commission for an increase in electric rates, reports Albert Cage, president.

The company seeks an average increase of 9.6% which would raise the average bill of Calectric's domestic customers 33c a month.

"So far our company has been partially able to withstand current inflationary pressures by increases in operating efficiency, but a very recent and substantial increase in the price we must pay for fuel used in the generation of electricity makes this no longer possible," the Calectric president said.

Electric Power Issue Low in Opinion Poll

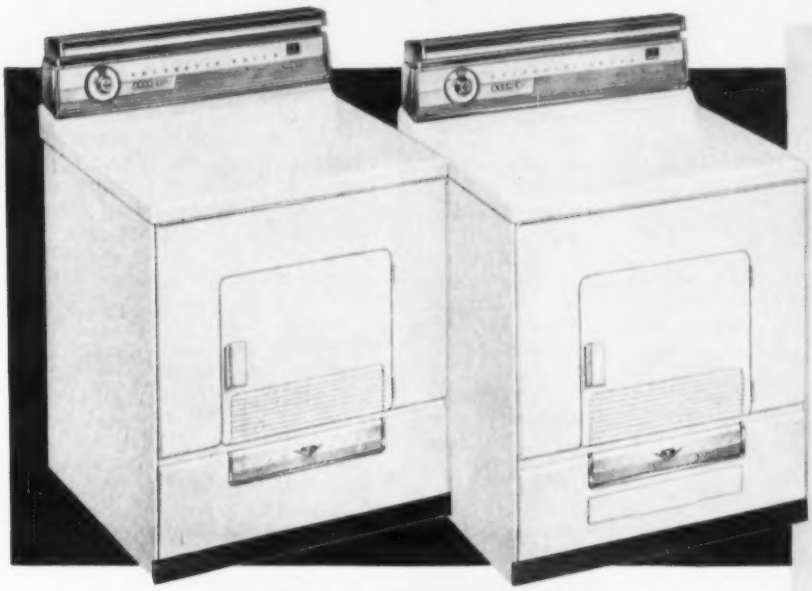
Only 2% of the voters in the Puget Sound-Cascade region of Washington state considered electric power to be an issue in last fall's general election, according to a survey conducted early this year for the Puget Sound Power & Light Co.

The survey is the second taken for the power company, an earlier one having been taken in mid-1956 by Elmo Roper & Associates. The second survey was conducted by Louis Harris, who had been in charge of the previous Roper study. Its results indicate that the following five major concerns dominated the last election among voters in the region: (1) The international situation, (2) The high cost of living, (3) Schools and education, (4) Labor problems and (5) The need for strong leadership in troubled times.

When asked specifically about "the so-called power controversy," the most frequent reply of those questioned was: "We have strong opinions on the subject, but we don't want electric power to be a political football."

The survey found that support for the philosophy of partnership and cooperation in the power field has grown substantially. In 1956, by nearly a 3 to 1 count, the people of the region preferred the concept of cooperation between private and public power to either alternative of all-public or all-private power. In the 1957 survey, the number who want cooperation increased to better than a 4 to 1 margin over either of the other alternatives.

Important to Utility Revenue!
there's a Hotpoint
Automatic Dryer To Fit Every Demand



Because automatic clothes dryers use an average of over 750 Kilowatt hours annually—*almost entirely concentrated in off-peak hours*—the clothes dryer load is becoming more and more important to utilities.

Here's the line of clothes dryers that helps you build this profitable load by surrounding every prospect with more reasons to buy. Hotpoint offers *two* types of Automatic Electric Clothes Dryers, in *seven* great new models.

There are three Sealed Chamber models that need no venting, and four Air-Blower Models with giant lint screen. A model for every need, every budget . . . and each is loaded with Hotpoint's famous pre-sold quality and convenience features that help you sell with a minimum of effort.

Your Hotpoint Distributor has the complete story on the widespread merchandising, acceptance and feature versatility of Hotpoint Automatic Dryers. Why not see him *today?*

Two Types—Seven Models

Hotpoint
Sealed Chamber Dryers
Three Models

No venting required! Ideal for installation in either utility room or kitchen. Purified, heated dry air takes moisture and lint from clothes. Cold water spray condenses moisture, and lint and water are pumped down the drain.

Hotpoint
Air-Blower Dryers
Four Models

Plug-in flexibility! One connection for either 115V or 230V operation. Hotpoint quality and convenience features, in a low price Air-Blower Dryer. Air-Blower models have giant Wide-Screen Lint Filter for increased drying efficiency.

Hotpoint Automatic Electric Dryers put more *salespower* behind "HOUSEPOWER"—more *living* in "LIVE BETTER . . . Electrically"!

LIVE BETTER ELECTRICALLY

Again, Hotpoint looks at Tomorrow, Today!

CLOTHES DRYERS • AUTOMATIC WASHERS • RANGES • REFRIGERATORS • DISHWASHERS • DISPOSALLS® • WATER HEATERS • FOOD FREEZERS • AIR CONDITIONERS • CUSTOMLINE • TELEVISION

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THE TIME PROVEN
1929
FOR YEARS...
THE UNCHALLENGED
LEADER IN ITS CLASS
THE PORCELAIN PRODUCTS
1929 WIREHOLDER IS THE
"STANDARD", BECAUSE OF:
Good Basic Design ✓
Sound Engineering ✓
Uniform High Quality ✓
Competitive Pricing ✓
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Plus a complete, quality line of
secondary service materials!
63 Years
Electrical Porcelain
Since 1894.
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Seaton Still Backs Trinity Despite Error

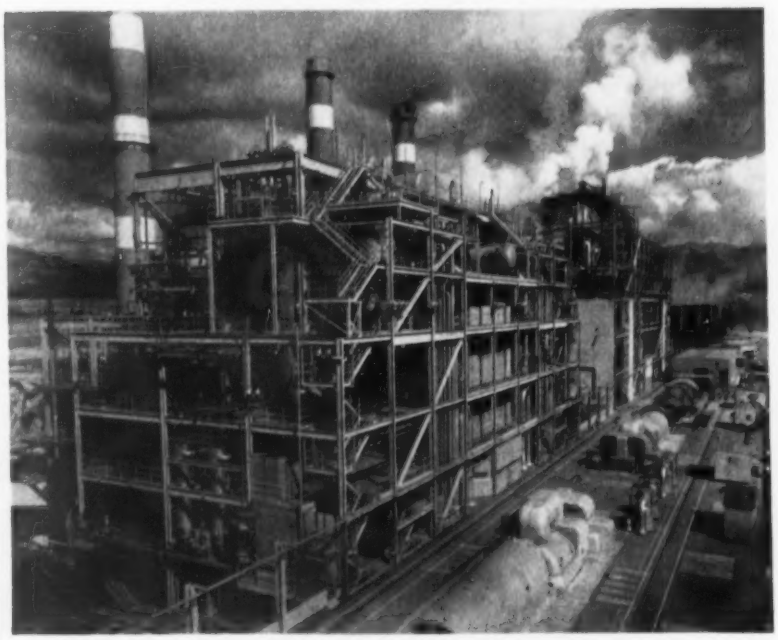
A revised computation indicating increased costs to preference customers under a joint development plan for the Trinity division, Central Valley Project, as compared with an all-federal development, was forwarded to the Congress by Secretary of the Interior Fred A. Seaton last month. The revision was made necessary because of inadvertent use by employees in the Sacramento regional office of the Bureau of Reclamation of an outdated rate schedule in the original computation which was submitted to Congress on Feb. 12. The computations are based on the Bureau of Reclamation's assumption as to customers it might serve.

The new computation provides an estimate that the difference to preference customers in buying energy from an all-federal Central Valley Project over a 50-year payout schedule would be $115,002,000 instead of $86,000,000 as originally reported. Of the total, $28,812,000 would be applicable to federal agencies in California which are served by the project and $86,190,000 to other preference customers. These figures are based on a project operation without the proposed southwest section of the Central Valley which is now before Congress for authorization.

If the San Luis unit was authorized as an integrated part of the Central Valley Project, the difference in cost estimated to preference customers from an all-federal development would be $149,940,000 instead of $118,000,000 as originally reported. Of this amount, the difference would be $91,920,000 to federal agencies and $58,020,000 to other preference customers. Under either all-federal or joint development the amount of firm power available for sale to preference agencies would be sharply reduced by inclusion of the San Luis unit, because of the large amounts of energy required to pump water to the San Luis area.

Secretary Seaton noted recent newspaper accounts to the effect that certain California communities were being led to believe that as much as 250,000 kw of additional power might be available for new customers of the bureau under all-federal construction of Trinity. He pointed out that this additional power could not be made available

Valley Steam Plant on the Line



Los Angeles' new power source, The Los Angeles Department of Water & Power's new 512,000-kw Valley steam plant, located on a 150-acre site in the San Fernando Valley, was formally dedicated Friday, May 17. J. C. Moller Jr., president of the Board of Water & Power Commissioners, made the official presentation to Mayor Morris Poulson, who accepted the facilities on behalf of the city. Following the dedication, visitors toured the plant, which held public open house through May 25

for new customers under all-federal construction if the San Luis unit is authorized and constructed. It also was noted that, despite differences on details, all interested members of Congress from northern California appear to be strongly supporting development of the San Luis unit.

Secretary Seaton, in his original submittal to Congress, recommended joint development of the project by the federal government and the Pacific Gas and Electric Co. because this would reduce the federal investment in the $225,000,000 project by $55,500,000. He also stated that the cost to preference agencies would be offset by the large differential in project surplus of $165,000,000 and $135,000,000 in federal, state and local taxes estimated by the company to be paid by it over 50 years of operation.

"These figures are not altered by the revised computation," Secretary Seaton said. "A joint development will still mean a considerable immediate monetary savings to the government and widespread benefits from increased tax revenue and income to the project over the 50-year period of company operation and ownership of the power facilities. It would require this same length of time to amortize the all-federal investment.

"It appears even more imperative now that we should take advantage of this opportunity to reduce the capital outlay by the federal government. Two recent contract awards have been made by the Bureau of Reclamation for Trinity construction which will substantially exceed the bureau's engineering cost estimates.

"At the end of 50 years, should the federal government elect to do so, the machinery is there to acquire the facilities by reimbursing the company for its net remaining investment. I have recommended more specific language on this point than is contained in the proposed agreement should the Congress authorize the joint development."

Property Tax Applies To Wyoming Municipals

Municipally owned electric plants are subject to property taxation in Wyoming, the attorney general's office has ruled.

"It is generally conceded that a city which enters the field of private competitive business for profit . . . forfeits its immunity from taxation," according to Bruce Badley, assistant attorney general.

AMCO PLASTIC CONDUIT IS NOW APPROVED FOR UNDERGROUND INSTALLATION

Many city and county inspectors and engineers have now approved of AMCO PLASTIC CONDUIT for their underground conduit installations. For cities and counties the prime consideration of any conduit installation is the expected length of service. They now know that they can expect the maximum service life from AMCO because it is not affected by soil corrosion, electrolysis, or rot.

Contractors, too, have marveled at the cost saving advantages of AMCO. The extreme light weight, the ease of handling, the simple solvent weld method of joining, have resulted in up to 75% labor savings. It is the ideal material for telephone raceways, and electrolier installations.

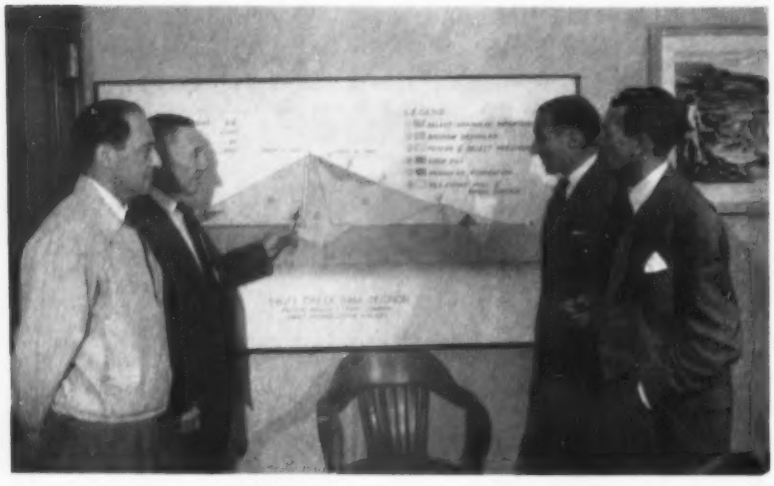
So if you are specifying and using conduit, your best choice is AMCO PLASTIC CONDUIT.

For a complete brochure and a cost study of a recent installation using AMCO, write to

AMCO PLASTIC PIPE CO.

2002 Davis Street San Leandro, California

French Engineers See Swift Project



Two French engineers who are directing construction of the Serre-Poncon Dam on the Durance River in southern France visited the site of Pacific Power & Light Co.'s Swift hydroelectric project in southwestern Washington on May 10. Jean Cabanius, director of the Alps region III of Electricate' de France, and Georges de la Jarrige, chief engineer for Electricite' de France, Marseille, were accompanied by Eric Schaefer, Utah Construction Co., San Francisco. Frank L. Beadle, in charge of Swift project construction for PP&L, conducted the trio on the trip to Lewis River Valley. Utah Construction is consultant on Serre-Poncon

Big Cooperative Forms In Pacific Northwest

Twelve rural electric cooperatives in Washington, Oregon and Idaho have announced the formation of a corporation for the generation and transmission of electric power for its participating members.

N. V. Fisher, manager of Lincoln Electric Cooperative, Inc., Davenport, Wash., who is temporary chairman of the group, said the corporation is the result of four years of organizational work. The new "super cooperative" will be the first of its kind in the Northwest.

The 12 cooperatives serve 33,800 customers in the three-state area and their combined plant investment totals more than $25,000,000.

The new enterprise is Lewis-Clark G & T Cooperative, Inc. Incorporation papers were filed June 12 with the State of Washington. Fisher said that Walla Walla, Wash., has been picked as the tentative location of the new cooperative's headquarters.

The organization will investigate the feasibility of constructing its own dams and transmission facilities. Fisher said preliminary engineering has been done at several dam sites, but no applications have been filed with the Federal Power Commission for preliminary permits. Also to be considered are forms of thermal generation, including atomic power if the cost is feasible.

Participating cooperatives are:

Washington: Inland Power and Light Co., Spokane; Benton Rural Electric Assn., Prosser; Big Bend Electric Cooperative Inc., Ritzville; Columbia Rural Electric Assn. Inc., Dayton; Lincoln Electric Cooperative Inc., Davenport, and Nespelem Valley Electric Cooperative Inc., Nespelem.

Idaho: Northern Lights Inc., Sandpoint; Clearwater Power Co., Lewiston; Idaho County Light and Power Cooperative Assn. Inc., Grangeville, and Kootenai Rural Electrification Assn. Inc., Coeur d'Alene.

Oregon: Eastern Oregon Electric Cooperative, Pendleton, and Columbia Basin Electric Cooperative Inc., Heppner.

Subcontractor Files Suit To Collect Standby Pay

A subcontractor on the long-delayed Mayfield hydroelectric dam of Tacoma City Light has filed suit in federal court at Tacoma against the general contractor.

J. G. Shotwell of Mercer Island asks $219,711 in compensation from the Arundel Corp. and the L. E. Dixon Co., plus $14,968 a month from April 1, 1957. The general contractor has been receiving standby pay from City Light but has passed none of it along to the subcontractors, the Shotwell suit charges. Shotwell did receive a $30,000 payment for setting his concrete-production plant at the site, however.

Shotwell claims he attempted to get a release of his contract from Arundel-Dixon to put his idle men and equipment to work on other jobs, but the prime contractor refused. Because of the long delay in the project, the original price of $1.15 per cu yd for concrete is "grossly inequitable," the suit declares.

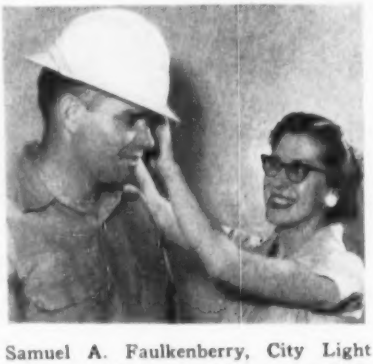
Rate Increase Hearing To Continue This Month

A California Public Utilities Commission hearing will resume July 10 in San Francisco on Pacific Gas and Electric Co.'s application for a 5.94% increase in electric rates.

Two points of special interest in the case:

The company is asking the commission to tie its rates to the cost of fuel oil and natural gas, allowing rates to fluctuate with these two items.

Joins Turtle Club



Samuel A. Faulkenberry, City Light wireman helper at Seattle, gets a little help from Mrs. Yvonne Strain, secretary of the inside construction division, while straightening out the souvenir safety hat he received recently upon his induction into the Turtle Club. He is the seventh Seattle City Light worker saved from death or injury by wearing a "hard hat." He was working at City Light's Bothell substation when a 75-lb hook-and-ball of a hydrocrane swung sidewise, knocking Faulkenberry down. Thanks to the safety helmet, only ill effects were a sore neck and back

CHECK THESE "SPECS"

Constructed of more die-formed parts than almost any other fixture of its type for rugged performance.

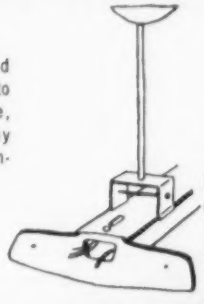
For general lighting the SIXTEEN-EIGHTY is unsurpassed for efficient long-term lighting economy.

Double acting positive spring clips retain side panels firmly to prevent rattling and to allow simple snap-in replacement.

An advanced concept of lighting comfort . . . the Sunbeam SIXTEEN-EIGHTY series has been critically engineered for the ultimate in universal application and lighting comfort.

Extruded metal rail reinforced plastic side panel to insure freedom from warpage or accidental breakage while enhancing design appearance.

Heavy gauge, die-formed end plates rigidly held to main channel. Large, smooth-edged wireway opening permits fast continuous row mounting.



For increased flexibility and ease of installation, die-formed channel accommodates sliding clamp hangers. No connectors required for continuous rows.

Translucent white plastic side panels of light stable Dow virgin #647 Styron are ribbed and contoured for architectural appeal. A 10° slant helps maintain longer lasting high efficiency and contributes to better brightness control from normal viewing angles.

CBM certified, ETL tested and UL approved parts.

90% reflectance durable baked white enamel "blends" with most contemporary ceilings.

The SIXTEEN-EIGHTY: it's easy to see by

Shielding assembly automatically disengages by means of spring-loaded latches and remains suspended from channel by jack chain for quick accessibility.

Surface or pendant mounted by use of nearly universal knockouts and sliding clamp channel.

Exacting photometric control achieves extremely high efficiency (up to 87%) with a controlled distribution of approximately 60% up and 40% down, a brightness of less than 1 c/in² within the shielded zone.

Rigidly constructed, vibration-free interlocked louver provides high, comfortable shielding of 35° x 35°—better than most school requirements.

Engineered for maximum heat dissipation for longer ballast life.

Bonderized for long-lasting corrosion resistance and tough paint adherence.

For technical information on this advanced concept of lighting, write for bulletin F-2.

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NEWS ABOUT PEOPLE

• **Ralph Loken** has assumed his duties as division vice-president of the Albuquerque division of the Public Service Co. of New Mexico. Loken, formerly division vice-president in Santa Fe, replaces George A. Schreiber, who was promoted to the position of administrative vice-president the first of this year.

• **Harry C. Donaldson,** who has been associated with the Montana utility industry for the last 30 years, was elected treasurer of the Montana Power Co., on May 22, in Butte. Donaldson was advanced from assistant secretary and assistant treasurer to succeed the late **James R. Sullivan,** who died April 30.

• **E. C. Saunders** has been appointed to the newly created post of customer accounting supervisor of San Diego Gas & Electric Co. Saunders will have general supervision of customer billing and bookkeeping, cashiers, and meter reading activities. He will also exercise functional direction of customer accounting activities in all district offices.

• **T. F. Hadwin** has been appointed superintendent of substations in the Bridge River area of British Columbia for British Columbia Electric. He has been with the company since 1935.

• **Orin Zimmerman** has been reassigned as an engineer in the distribution department of the Portland General Electric's Portland office. Assigned temporarily to the Portland office since January, he was formerly chief field engineer in PGE's Yamhill division with headquarters at Newberg.

• **Lloyd Asburry** has been named general line foreman for Portland General Electric's Willamette Valley division. Asburry's promotion was effective May 31. A PGE employee since 1937, he was formerly communications foreman for the company.

• **Arthur C. Bratt,** consulting engineer for Montana Power Co. was awarded honorary membership in the Montana Society of Engineers at the group's recent 70th annual meeting. He was cited for his work in electrical transmission and hydraulic design. He is an electrical engineering graduate of the University of Minnesota.

• **Donald L. Jordin,** industrial engineer for Washington Water Power Co., has been named farm sales supervisor. He joined the company as an agricultural representative in the Big Bend division in 1947. In the new post he will coordinate sales planning, promotion and customer service in all five company divisions. **Rich Bakes,** who formerly held the post, has been named Spokane division plant engineer.

• **Harry O. Barber,** superintendent of the Rock Island power plant retired recently from the Chelan County (Wenatchee, Wash.) PUD No. 1. Barber began his career with the Puget Sound Power & Light Co. in 1905 and continued with them until January 1956, when the Rock Island plant was purchased by the PUD. He will remain in Wenatchee and be available as an electrical engineering consultant.

• **Tom Quast** of Marysville, Wash., a commissioner of the Snohomish County PUD, was elected chairman of the Puget Sound Utilities Council at Seattle. He succeeds Dean Barline, representing Tacoma City Light. Chairmanship rotates among the five member utilities, the other three being Seattle City Light, Puget Sound Power & Light Co. and the Chelan County PUD.

• Pacific Power & Light Co. has transferred **Vic Bauer** from Portland to Casper, Wyo., as industrial development engineer for the company's service area. Bauer will help in the long-range development of Wyoming's natural resources, attracting new industry and helping existing industries expand their markets for goods and services. Bauer, an electrical engineer, completed a report on manufacture of synthetic wood products from wood waste which recently attracted nation-wide attention.

Montana Managers Change, Byers Takes Retirement

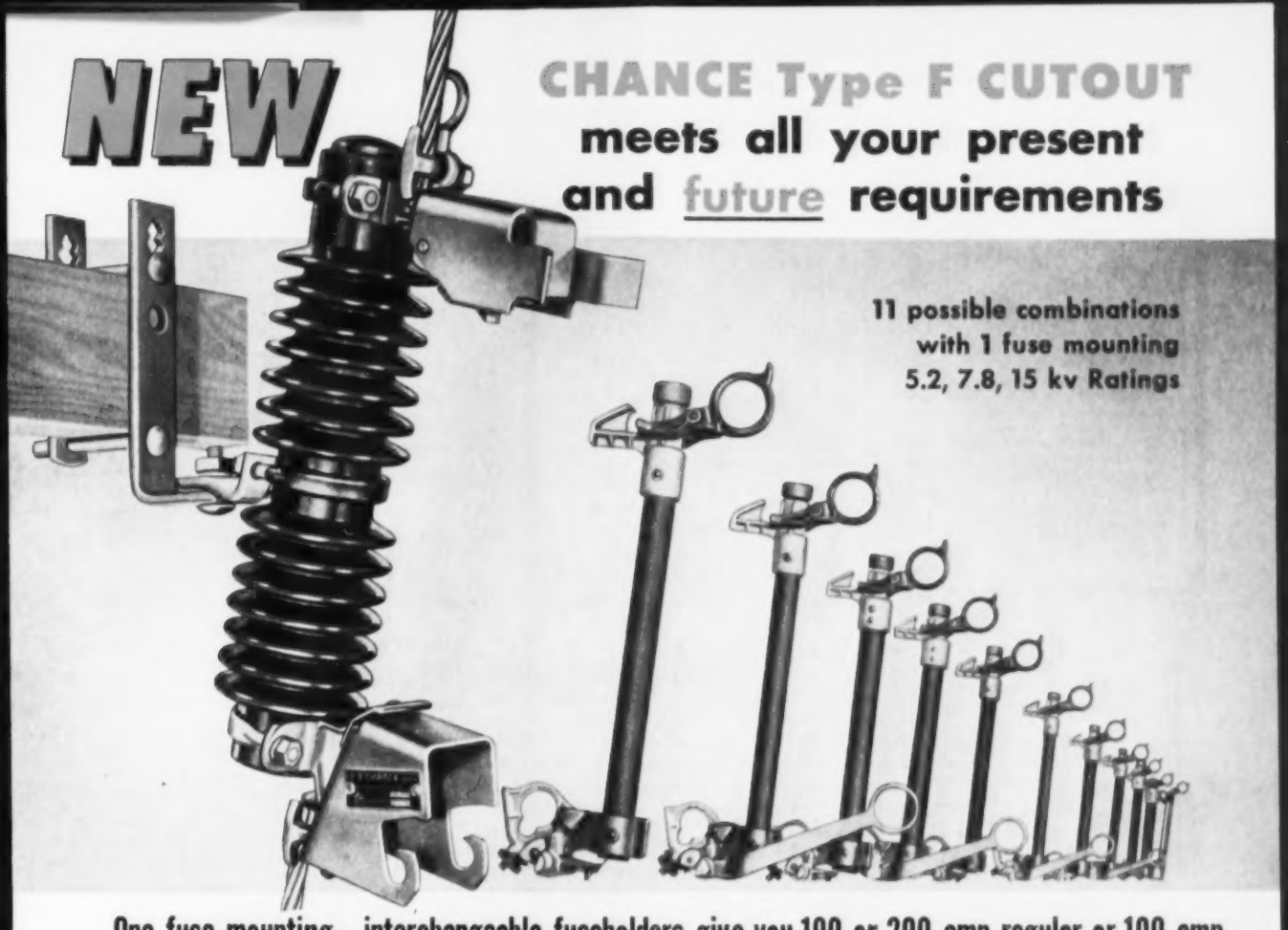
Matt R. Byers, manager of Montana Power Co.'s Great Falls division, retired June 1 after serving with the company since 1917.

His successor in the managership is H. K. Dickinson, former manager of the Helena division. Dix C. Shevalier, who has been executive assistant to officers in Butte, will assume managership of Helena division.

Byers is a native of Indiana and has served as manager of various divisions during 37 of his 40 years with the company.

NEW

CHANCE Type F CUTOUT
meets all your present and future requirements



11 possible combinations with 1 fuse mounting 5.2, 7.8, 15 kv Ratings

One fuse mounting—interchangeable fuseholders give you 100 or 200 amp regular or 100 amp load break cutouts—interrupting capacities 2000 to 12000 amps, plus a disconnect

Here's a way to simplify your cutout stocking problems—lower storage, handling and installation costs. With the Chance Type "F" line of cutouts, you stock only one type of fuse mounting and a choice of fuseholders for complete system protection. You can choose from *eleven* different combinations, including a disconnect, to fit your exact needs. And when you want to up-rate an installed cutout or convert it to load break, a simple change of fuseholders does the job—*in the same fuse mounting!*

The Type "F" Cutout combines 16 important features asked for by distribution engineers in a nationwide field check . . . and *only* the Chance Type "F" offers *all* these features! Check the table below. Ask your Chance Distributor to show you this new Cutout line, or write us.

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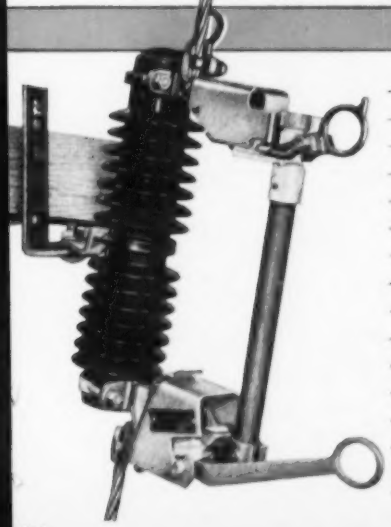

	Chance Type "F"	Cutout "G"	Cutout "H"	Cutout "I"	Cutout "J"	Cutout "K"	Cutout "L"	Cutout "M"
Interchangeable Fuseholders Covering Complete NEMA Range	YES	NO	YES	NO	NO	YES	NO	NO
Wrap Around Insulator Bolts	YES	YES	NO	YES	YES	NO	NO	NO
Bird Proof Construction	YES	YES	YES	YES	NO	YES	NO	YES
Lift and Tie Ring	YES	NO	NO	NO	NO	NO	YES	YES
Universal Terminals	YES	YES	NO	YES	YES	YES	NO	NO
Sleet Hoods at Both Ends	YES	YES	NO	YES	NO	NO	NO	NO
Positive Guiding of Tube	YES	YES	YES	YES	NO	YES	YES	YES
Positive Latch	YES	NO	NO	NO	NO	NO	YES	NO
All Contact Surfaces Silver Plated	YES	YES	YES	YES	NO	NO	YES	YES
Self Cleaning Contacts	YES	YES	YES	YES	YES	NO	YES	YES
Lever Action When Opening	YES	NO	NO	NO	NO	NO	NO	NO
Link Ejector	YES	NO	NO	NO	NO	NO	YES	YES
Load Break	YES	YES	YES	YES	YES	YES	YES	NO
Fuseholder Cannot be Installed Backwards	YES	YES	NO	YES	YES	YES	YES	YES
180° Stop to Prevent Fuseholder Swinging Back into Pole	YES	NO	NO	YES	YES	NO	NO	YES
NEMA Standard Mounting Bracket	YES	YES	YES	YES	YES	YES	YES	YES

56-6

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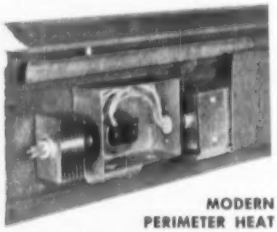
HEATSUM ELECTRIC BASEBOARD

(Illustration of cut-a-way section)



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BASEBOARD UNITS—available in many lengths and wattages. They are designed for a completely harmonized installation in any room. Units may be joined; blank sections available for extensions.
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• **George Brunzell** of the Washington Water Power Co. has been appointed to the Washington State Power Advisory Committee by Gov. Albert Rosellini.

Deaths

• **Bert F. Kefauver,** 45, district sales manager for Graybar Electric Co., Los Angeles, since October 1956, died suddenly at his Los Angeles home on Sunday, May 5. A member of the Graybar organization for the past 20 years, Kefauver served as branch manager in Graybar's Phoenix office from April 1953, until coming to Los Angeles six months ago in October to take over the district managership. He was a member of the Electric Club of Los Angeles, PCEA, and American Institute of Electrical Engineers.

• **James E. E. Royer,** 72, who retired last July as vice-president and general manager of Washington Water Power Co., died May 22 at Spokane. He had been the oldest active WWP employee in point of service when he retired. Since his retirement, he had continued as a member of the WWP board of directors and its executive and retirement committees. He joined WWP in 1907 as a generator repair crew helper. He advanced to system operator and in 1930 became general manager. Two years later he was named vice-president.

• **Joseph T. Krivanek,** pioneer electrical contractor of Longview, who retired from business two years ago, died May 15. He had begun his long electrical career with Shoshone Power & Light Co. and was its manager in 1909, then went into business in Longview as a contractor and wired many of the mills and buildings in the area. He served as director of Northwest Electric Light & Power Assn. and in many association and civic posts. His son, Joseph Krivanek Jr., is assistant manager of Northern California Chapter, N E C A, Oakland.

• **Clifford Gear,** 53, manager of Oakridge, Ore. operations of the Lane County Electric Cooperative from 1950 to 1956, died May 23 in Salem following a heart attack en route from Portland to Oakridge. His career had included 12 years as a dredge master in South America.

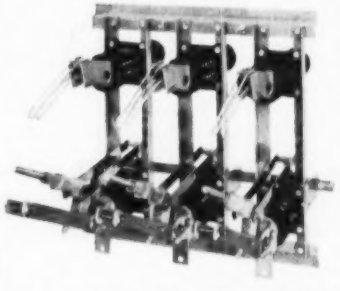
• **James R. Sullivan,** 58, treasurer of Montana Power Co., died April 30 at his home in Butte. Sullivan was connected with the utility for 41 years, starting his employment with the concern in 1916 as an office boy. When only 26 he became chief accountant for the company. He was named assistant treasurer in 1940 and became treasurer in 1949.

• **John A. Ackerman,** electric service inspector of Seattle City Light, died May 4, after a long illness. He had spent nearly half of his life helping provide electric service for Seattle citizens. He started with Puget Sound Power & Light Co. in July, 1929, and transferred to City Light in March 1951 when the department acquired the company's properties in the Seattle area.

• **Carl Edward Messinger,** 59, supervisor of the accounting and billing department of San Diego Gas & Electric Co., died recently in San Diego. He was a member of the Office Managers Assn. of San Diego, the Pacific Coast Electrical Assn. and the Electric Club.

• **Albert E. Johnstone,** 80, a San Diego resident since 1887 and former city electrical inspector for 35 years, died recently. He was a member of the San Diego Rowing Club, the Electric Club, the Old Timers Club, and at one time was the state's youngest Masonic leader.

SPECIFY 3E AIR INTERRUPTER SWITCHES FOR AUTO-SPEED INTERRUPTION



SPECIFY SAFETY FOR PERSONNEL AND EQUIPMENT. No exposed arc.

SPECIFY ECONOMY, costing less than circuit breakers, and with interrupting capacity not found in air break disconnects.

SPECIFY ENGINEERING ABILITY. 3E's staff of engineers is experienced in adapting or combining equipment for complete switching centers or additions to existing units.

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NEW

No. 53-XPJ Nicopress Tool with *Three Grooves*

Accommodates Nicopress Sleeves

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4A, 6A, 8A, 6C, 8C, 6D, 8D, 9½D, 3 No. 10, 3 No. 12, 4 solid, 6 solid, 8 solid, 10 solid.

FOR ALL-ALUMINUM

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The 25th Annual MANUFACTURERS' DIRECTORY

The Manufacturers' Directory lists, free of charge, manufacturers of electrical equipment, appliances and supplies, their Western Offices and their Western representatives. It also includes a directory of manufacturers' representatives handling electrical lines. This Directory is published each year as a supplement to our regular November issue.

ELECTRICAL WEST

68 Post Street, San Francisco 4, Calif.

NOTES ON THE TRADE

James

• **Hubert James Jr.** has been named Western regional sales manager for Anderson Electric Corp. He will be headquartered in San Francisco to cover the eleven Western states. His primary function will be sales supervision in the eleven-state area working directly with the five major manufacturers' representatives who have direct sales responsibility. Before joining Anderson Electric, Mr. James was in the Electric Apparatus Sales Division of General Electric in San Francisco. He is a graduate of the University of California.

• **I. W. Borda,** formerly vice-president and manager of Pacific Coast sales of The Okonite Co. has been named vice-president and general sales manager. In this new capacity, Borda will be in charge of all field sales personnel and market specialists. He will assume his new duties on or about July 1. Educated at the United States Military Academy at West Point, Borda is a past-president of the Pacific Coast Electric Assn. and has been active in many civic affairs in the San Francisco area.

• **The Bristol Co.** of Waterbury, Conn. has just opened a new branch factory and repair laboratory in Los Angeles as part of a general expansion program. The new facility is located at 6800 East Acco St., and will be managed by J. W. Peckham, who has been Bristol's West Coast district manager for many years.

Fuller

• **J. F. Fuller** has been appointed Rocky Mountain district manager of application engineering user sales for General Electric Co.'s Apparatus Sales Division. Fuller, who graduated from the University of Colorado in 1944, was awarded in 1952 G-E's top employee honor, the Charles A. Coffin Award, for "work of outstanding merit" in developing a portable d-c network analyzer.

Vick

• **Century Electric Co.** of St. Louis has opened a branch office in Portland, Ore., to handle sales in the Pacific Northwest area. The new office, located at 1238 N. W. Glisan St. is headed by **Donald R. Vick.**

• An eastern expansion program for Sunbeam Lighting Co., Los Angeles, is announced by Herbert L. Krieger, president. The company acquired the 41/2-acre Reynolds Metal Co. plant at Gary, Ind. The new facility, to be designated Sunbeam Lighting Co., Inc., Eastern, was expected to be in operation by about July 1.

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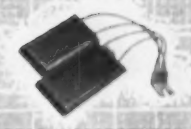
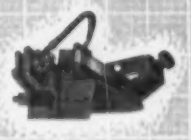
ALL SIX!

1. Motor and Generator Brushes
Morganite brushes enjoy a reputation world-wide for trouble-free service. For fractional horsepower, aircraft, automotive, traction and industrial use.



2. Carbon Brush Holders
Assure high efficiency brush operation by maintaining positive contact between the brush and the commutator or ring. Standard types include cantilever radial, radial, trailing, reaction and AC slip ring holders.



3. Electrical Contacts
Including drum controllers, contactors and starters. Incorporate metals in a refractory carbon base for improved electrical conductivity and mechanical strength. Self-lubricating; non-welding.

4. Carbon Current Collectors
Reduce operating costs on travelling cranes. Cost less, wear longer and reduce conductor wear to a minimum. Will not blister or rough conductor, afford trouble-free service over long periods.

5. Carbon Specialties
Morganite self-lubricating carbon specialties include bearings, seal noses, piston rings and pistons, pump vanes, valves, radar components and other parts for electrical and mechanical equipment.

6. Morganite Refractories
TRIANGLE RR, impervious recrystallized alumina, crucibles, insulators, pyrometer and furnace tubes. 99.7% Al_2O_3 —max. temp. 1950°C—3542°F. TRIANGLE HS, impervious mullite tubes. Max. temp. 1700°C—3092°F.

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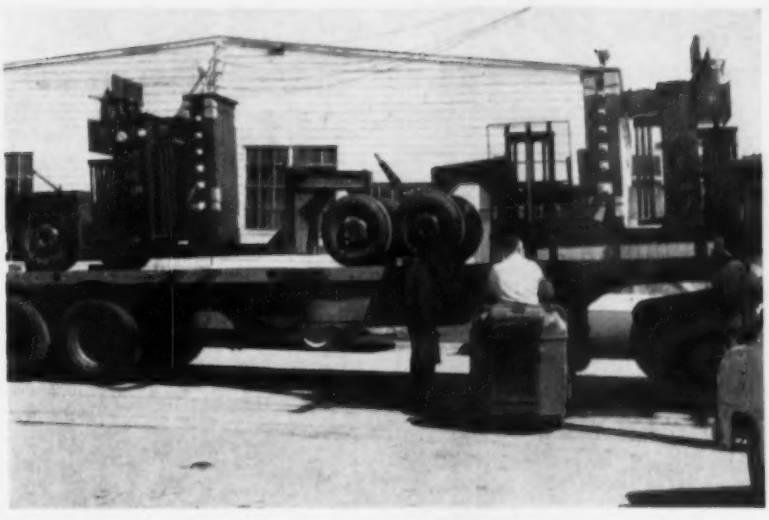

Two of six portable power units recently ordered by the Atomic Energy Commission for its nuclear test work on the Nevada desert are readied for delivery at Hill Transformer Co. Inc., in San Carlos, Calif. Transformers are special 225-kva, 4,160-480 models, trailer-mounted for easy transportation to desert sites

• **Line Materials Industries** has filmed a new movie entitled "Let's Look at Lightning!" Highlights include a review of the basic conditions which cause lightning and solutions to various distribution lightning arrester application problems. Important but often overlooked facts and figures on lightning arrester application are illustrated. A showing can be arranged through the nearest L-M field representative or by writing Line Material Industries, McGraw-Edison Co., Milwaukee 1, Wis.

• **Cole Electric Co.** announces that effective immediately all sales of electric utility equipment in southern California will be handled directly from its Culver City plant. Cole manufactures an extensive line of disconnecting switches, circuit breakers and metal-clad switching equipment.

• **Purchase of Electric Controls** Inc., Portland, has been announced by the new owners, John S. Mears and his father, A. M. Mears. The name of the firm will be changed to Mears Electric Controls Inc. President John Mears said plans are already in operation to expand distribution of its line voltage thermostats and residential load regulators. The products are currently marketed nationally through manufacturers' agents, heater manufacturers and jobbers. The company will continue to supply thermostats to the Glassheat and Ray-Heat companies among others, he said.

• **Henry John Soubielle** has been named Pacific Coast regional engineer for the Westinghouse Lamp Division. His headquarters are at 5815 Peladeau St., Emeryville. He was associated with the electrical industry for nine years before joining Westinghouse. He is a member of the Illuminating Engineering Society and the Electric Club of Oakland.

Beard

• E. L. Buttner, president of Scott-Buttner Electric Co., has announced that **R. W. Beard** has been made executive vice-president with responsibility for sales and new business development, and will have his headquarters in the San Francisco office, 474 Natoma St., and that **E. M. "Ted" Buttner** has been made vice-president and general manager of the company with responsibility for administration, estimating, and installation, and will be located at the main office, 986 West Grand Ave., Oakland.

Buttner

• **Ted Tesman Agencies** Co., 836 Traction Ave., Los Angeles, began an enlarging and remodeling program May 10, to increase present warehousing and sales display room facilities. The company, which until October 1956 had 7,000 sq ft of display area, has leased an additional 13,000 sq ft at 844 and 848 Traction Ave., and is in the process of remodeling and redecorating the area to provide additional, modern sales display and meeting rooms. A June 30 completion date was expected. Additional warehousing space also has been leased at the same address. The new space will provide a gross of 20,000 sq ft for warehousing of all lines carried by Tesman Agencies.

• **James W. Billings** of Atlanta, Ga., has been named Pacific sales district manager for General Electric Co.'s large lamp department, it is announced by regional manager **Donald D. Scarff.** Billings succeeds Scarff, who was named to the reginal post earlier this month. Billings' district covers northern California, most of Nevada and the Hawaiian Islands, and he will have resident salesmen in Fresno, Sacramento and Saratoga.

• *Jasper Blackburn* Corp. sends word that its new plant is in operation in St. Louis. Address is 1525 Woodson Road, St. Louis 14, Mo. The telephone number is WYdown 3-9430.

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PROFILES

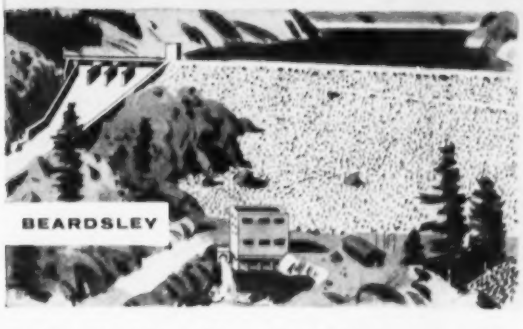
Mrs. Roland R. Miner, now president of Miner & Miner, Consulting Engineers Inc. of Greeley, Colo. The firm was founded 11 years ago as a husband and wife partnership and Mrs. Miner was secretary-treasurer until her husband's sudden death last March. She plans to continue actively with the organization, a six-state operation employing about 25 people and engaged mainly in projects involving electric power and telephone systems

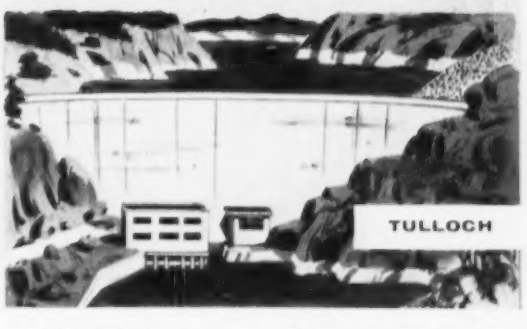
Walter E. Heiman, for many years a leading sales representative of Tri-State Supply Corp., Los Angeles was one of 10 Western salesmen selected to receive the "Sammy" award. The award was sponsored by the Los Angeles Sales Executives Club as an event of Salesmen's Recognition Week. A. H. Howard, sales manager of Tri-State, is at right

Anaconda Wire & Cable Co. hosted a three-day sales conference, highlighted by a dinner for executives and wives of Tri-state Supply Corp., Los Angeles, in honor of that firm's 10th anniversay as distributor for Anaconda Magnet Wire in the Western area. Executives pictured above, left to right seated, are: A. W. Tracy, Anaconda Los Angeles district manager; Harry L. Saums, director of research and development, Magnet Wire, Anaconda; C. F. Bowers, Tri-State president; and M. J. McCarthy, commercial vice-president, Anaconda. Back row, left to right, are: A. H. Howard, Tri-State sales manager; Edwin F. Gould, general manager of Anaconda's Orange, Calif., plant; Frank Dickey, Anaconda San Francisco district manager; and George M. Eickmeyer, Tri-State vice president and San Francisco manager

NEW TRI-DAM

How P. G. & E. works with farmers in the great Tri-Dam Project on the Stanislaus River . . . to bring more water and electricity to California





On the Stanislaus River, three big dams — a joint project of the Oakdale and South San Joaquin Irrigation Districts — were dedicated on June 15. The Tri-Dam Project means a lot of new irrigation water for the Oakdale, Manteca, Ripon, Escalon and Riverbank areas. On its way to the fields, the water will turn electric generators, producing enough electricity to supply 145,000 homes. P. G. and E. will distribute the power, paying the Irrigation Districts $115,000,000 for it over a 45-year contract period. This revenue pays for the three dams and powerhouses. Thus a vast new source of irrigation water is provided FREE. And P. G. and E. gets another source of power to serve the growing needs of its customers. P. G.and E. has business arrangements like this with a number of other water development projects in Northern and Central California. And everyone benefits.

John Vrieling, President of the South San Joaquin Irrigation District, says this about the P. G. and E. cooperative plan: "The contract with P. G. and E. will give sufficient revenue to meet all the construction, operating and maintenance costs of the project. So the additional water made available to the land owners is free at the canal. And I believe it's a good arrangement for P. G. and E., too, because it provides the Company with another source of power. *It's a good deal all around.*"

P·G and E·

Pacific Gas and Electric Company

Vang

To vang is to catch or seize. About all some people can vang is a cold or a little hell. Others have no trouble vanging taxis, fish or opportunity when it comes along.

Which kind of person are you? Have you, for example, vanged the opportunity presented by the electric industry's national "Live Better... Electrically" and "Full HOUSE-POWER" programs?

This concerted attack on the wiring bottleneck is vanging the imagination of all segments of the electric industry. Feature these campaigns in ***your*** advertising and sales promotion and you'll be helping yourself to bigger and better markets and sales.

For complete details on either promotion, as well as other PCEA activities, come in or write to either of our offices.

PACIFIC COAST ELECTRICAL ASSOCIATION

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